The African Organisation for Standardisation

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ARS 53 (2012) (English): General principles of food hygiene -- Code of practice

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General principles of food hygiene — Code of practice

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Foreword

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This African Standard was prepared by the ARSO Technical Harmonization Committee on Agriculture and Food Products (ARSO/THC 1).

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ARSO Central Secretariat
International House 3rd Floor
P. O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel. +254-20-224561, +254-20-311641, +254-20-311608
Fax: +254-20-218792
E-mail: arso@arso-oran.org
Web: www.arso-oran.org

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ARSO Central Secretariat
International House 3rd Floor
P.O. Box 57363 — 00200 City Square
NAIROBI, KENYA

Tel: +254-20-224561, +254-20-311641, +254-20-311608
Fax: +254-20-218792

E-mail: arso@arso-oran.org
Web: www.arso-oran.org

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Introduction

People have the right to expect the food they eat to be safe and suitable for consumption. Foodborne illness and foodborne injury are at best unpleasant; at worst, they can be fatal. But there are also other consequences. Outbreaks of foodborne illness can damage trade and tourism, and lead to loss of earnings, unemployment and litigation. Food spoilage is wasteful, costly and can adversely affect trade and consumer confidence.

International food trade and foreign travel are increasing, bringing important social and economic benefits. But this also makes the spread of illness around the world easier. Eating habits too, have undergone major change in many countries over the last two decades and new food production, preparation and distribution techniques have developed to reflect this. Effective hygiene control, therefore, is vital to avoid the adverse human health and economic consequences of foodborne illness, foodborne injury, and food spoilage. Everyone, including farmers and growers, manufacturers and processors, food handlers and consumers, has a responsibility to assure that food is safe and suitable for consumption.

The principal objective of the general and specific hygiene requirements is to ensure a high level of consumer protection with regard to food safety. An integrated approach is necessary to ensure food safety from the place of primary production up to and including placing on the market or export. Every food business operator along the food chain should ensure that food safety is not compromised.

These General Principles lay a firm foundation for ensuring food hygiene and should be used in conjunction with each specific code of hygienic practice, where appropriate, and the guidelines on microbiological criteria. The document follows the food chain from primary production through to final consumption, highlighting the key hygiene controls at each stage. It recommends a HACCP-based approach wherever possible to enhance food safety as described in *Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application* (Annex A).

Successful implementation of the procedures based on the HACCP principles will require the full cooperation and commitment of food business employees. To this end, employees should undergo training. The HACCP system is an instrument to help food business operators attain a higher standard of food safety. The HACCP system should not be regarded as a method of self-regulation and should not replace official controls.

The principles should provide sufficient flexibility to be applicable in all situations, including in small businesses. In particular, it is necessary to recognize that, in certain food businesses, it is not possible to identify critical control points and that, in some cases, good hygienic practices can replace the monitoring of critical control points. Similarly, the requirement of establishing ‘critical limits’ does not imply that it is necessary to fix a numerical limit in every case. In addition, the requirement of retaining documents needs to be flexible in order to avoid undue burdens for very small businesses.

Flexibility is also appropriate to enable the continued use of traditional methods at any of the stages of production, processing or distribution of food and in relation to structural requirements for establishments. Flexibility is particularly important for regions that are subject to special geographical constraints. However, flexibility should not compromise food hygiene objectives. Moreover, since all food produced in accordance with the hygiene rules will be in free circulation throughout the continent, the procedure allowing Member States to exercise flexibility should be fully transparent.

In the preparation of this African Standard, the following documents were consulted extensively:

CAC/RCP 01:1969, Rev. 4:2003, *Recommended International Code of Practice — General Principles of Food Hygiene*

Commission Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs

Assistance derived from these sources is hereby acknowledged.

Objectives

The general principles of food hygiene:

- identify the *essential* principles of food hygiene applicable *throughout the food chain* (including primary production through to the final consumer), to achieve the goal of ensuring that food is safe and suitable for human consumption;

- recommend a HACCP-based approach as a means to enhance food safety;

- indicate *how* to implement those principles; and

- provide a *guidance* for specific codes which may be needed for — sectors of the food chain; processes; or commodities; to amplify the hygiene requirements specific to those areas.

Experience has shown that it is necessary to adopt measures aimed at guaranteeing that unsafe food is not placed on the market and at ensuring that systems exist to identify and respond to food safety problems in order to ensure the proper functioning of the internal market and to protect human health.

In order to ensure the safety of food, it is necessary to consider all aspects of the food production chain as a continuum from and including primary production and the production of animal feed up to and including sale or supply of food to the consumer because each element may have a potential impact on food safety.

Experience has shown that for this reason it is necessary to consider the production, manufacture, transport and distribution of feed given to food-producing animals, including the production of animals which may be used as feed on fish farms, since the inadvertent or deliberate contamination of feed, and adulteration or fraudulent or other bad practices in relation to it, may give rise to a direct or indirect impact on food safety.

For the same reason, it is necessary to consider other practices and agricultural inputs at the level of primary production and their potential effect on the overall safety of food.

This standard was first issued as: ARS 53:1986(E), *Recommended general hygienic practice for food.*

This current edition represents a technical review to take into account current practices.

General principles of food hygiene — Code of practice

1 Scope and application

1.1 Scope

This African standard specifies the general principles for the hygiene requirements for producing food which is safe and suitable for consumption. This standard lays down general requirements for food business operators on the hygiene of foodstuffs, taking particular account of the following principles:

a) primary responsibility for food safety rests with the food business operator;

b) it is necessary to ensure food safety throughout the food chain, starting with primary production;

c) it is important, for food that cannot be stored safely at ambient temperatures, particularly frozen food, to maintain the cold chain;

d) general implementation of procedures based on the HACCP principles, together with the application of good hygiene practice, should reinforce food business operators' responsibility;

e) guides to good practice are a valuable instrument to aid food business operators at all levels of the food chain with compliance with food hygiene rules and with the application of the HACCP principles;

f) it is necessary to establish microbiological criteria and temperature control requirements based on a scientific risk assessment;

g) it is necessary to ensure that imported foods are of at least the same hygiene standard as food produced in the Community, or are of an equivalent standard.

This Code shall apply to all stages of production, processing and distribution of food and to exports, and without prejudice to more specific requirements relating to food hygiene. Such specific requirements and guidelines should be read in conjunction with this standard, *Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application* (Annex A) and ISO 22000.

1.2 Application exceptions

This Code shall not apply to:

a) primary production for private domestic use;

b) the domestic preparation, handling or storage of food for private domestic consumption;

c) the direct supply, by the producer, of small quantities of primary products to the final consumer or to local retail establishments directly supplying the final consumer;

d) collection centres and tanneries which fall within the definition of food business only because they handle raw material for the production of gelatine or collagen.

1.3 General obligation

Food business operators shall ensure that all stages of production, processing and distribution of food under their control satisfy the relevant hygiene requirements laid down in this Code.

1.4 General and specific hygienic requirements

1.4.1 Food business operators carrying out primary production and associated operations shall comply with the general hygiene provisions laid down in Clause 6.

1.4.2 Food business operators carrying out any stage of production, processing and distribution of food after those stages to which 1.4.1 applies shall comply with the general hygiene requirements laid down in 7 to 22.

1.4.3 Food business operators shall, as appropriate, adopt the following specific hygiene measures:

a) compliance with microbiological criteria for foodstuffs;

b) procedures necessary to meet targets set to achieve the objectives of this standard;

c) compliance with temperature control requirements for foodstuffs;

d) maintenance of the cold chain;

e) sampling and analysis.

1.4.4 When this standard does not specify sampling or analysis methods, food business operators may use appropriate methods laid down in relevant African Standards or, in the absence of such standards, methods that offer equivalent results to those obtained using the reference method, if they are scientifically validated in accordance with internationally recognized rules or protocols.

1.5 Use

Clause 5 covers primary production and associated procedures. Although hygiene practices may differ considerably for the various food commodities and specific codes should be applied where appropriate, some general guidance is given in this clause. Clauses 6 to 22 set down the general hygiene principles which apply throughout the food chain to the point of sale. Clause 19 also covers consumer information, recognizing the important role played by consumers in maintaining the safety and suitability of food.

There will inevitably be situations where some of the specific requirements contained in this Code are not applicable. The fundamental question in every case is “what is necessary and appropriate on the grounds of the safety and suitability of food for consumption?”

The text indicates where such questions are likely to arise by using the phrases “where necessary” and “where appropriate”. In practice, this means that, although the requirement is generally appropriate and reasonable, there will nevertheless be some situations where it is neither necessary nor appropriate on the grounds of food safety and suitability. In deciding whether a requirement is necessary or appropriate, an assessment of the risk should be made, preferably within the framework of the HACCP approach. This approach allows the requirements in this document to be flexibly and sensibly applied with a proper regard for the overall objectives of producing food which is safe and suitable for consumption. In so doing it takes into account the wide diversity of activities and varying degrees of risk involved in producing food. Additional guidance is available in specific food codes.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 56, *Prepackaged foods — Labelling*

EAS 12, *Drinking (potable water) — Specification*

CAC/GL 2, *Guidelines on nutrition labelling*

CAC/GL 21, *Principles for the establishment and application of microbiological criteria for foods*

CODEX Stan 192, *General standard for food additives*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1
food; foodstuff
any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans

(a) ‘food’ includes drink, chewing gum and any substance, including water, intentionally incorporated into the food during its manufacture, preparation, treatment or on its own

(b) ‘food’ does not include:

- (i) feed;
- (ii) live animals unless they are prepared for placing on the market for human consumption;
- (iii) plants prior to harvesting;
- (iv) medicinal products;
- (v) cosmetics;
- (vi) tobacco and tobacco products;
- (vii) narcotic or psychotropic substances within the meaning of the United Nations Single Convention on Narcotic Drugs, 1961, and the United Nations Convention on Psychotropic Substances, 1971;
- (viii) residues and contaminants

3.2
food hygiene; hygiene
the measures and conditions necessary to control hazards and to ensure fitness for human consumption of a foodstuff taking into account its intended use

3.3
food law
the laws, regulations and administrative provisions governing food in general, and food safety in particular, whether at continental or national level; it covers any stage of production, processing and distribution of food, and also of feed produced for, or fed to, food-producing animals

3.4
food business
any undertaking, whether for profit or not and whether public or private, carrying out any of the activities related to any stage of production, processing and distribution of food

3.5
food business operator
the natural or legal persons responsible for ensuring that the requirements of this standard are met within the food business under their control

3.6
feed; feedingstuff
any substance or product, including additives, whether processed, partially processed or unprocessed, intended to be used for oral feeding to animals

3.7
feed business
any undertaking whether for profit or not and whether public or private, carrying out any operation of production, manufacture, processing, storage, transport or distribution of feed including any producer producing, processing or storing feed for feeding to animals on his own holding

3.8
feed business operator
the natural or legal persons responsible for ensuring that the requirements of this standard are met within the feed business under their control

3.9
primary products
products of primary production including products of the soil, of stock farming, of hunting and fishing

3.10
primary production
the production, rearing or growing of primary products including harvesting, milking and farmed animal production prior to slaughter. It also includes hunting and fishing and the harvesting of wild products

3.11
establishment
any building or area in which food is handled and the surroundings under the control of the same management

3.12
retail
the handling and/or processing of food and its storage at the point of sale or delivery to the final consumer, and includes distribution terminals, catering operations, factory canteens, institutional catering, restaurants and other similar food service operations, shops, supermarket distribution centres and wholesale outlets

3.13
placing on the market
the holding of food or feed for the purpose of sale, including offering for sale or any other form of transfer, whether free of charge or not, and the sale, distribution, and other forms of transfer themselves

3.14
stages of production, processing and distribution
any stage, including import, from and including the primary production of a food, up to and including its storage, transport, sale or supply to the final consumer and, where relevant, the importation, production, manufacture, storage, transport, distribution, sale and supply of feed

3.15
competent authority
the central authority of a Member State competent to ensure compliance with the requirements of this standard or any other authority to which that central authority has delegated that competence; it shall also include, where appropriate, the corresponding authority of a third country

3.16
equivalent
in respect of different systems, capable of meeting the same objectives

3.17
contamination
the introduction or occurrence of a contaminant in food or food environment

3.18
potable water
water meeting the minimum requirements of EAS 12

3.19
clean seawater
natural, artificial or purified seawater or brackish water that does not contain micro-organisms, harmful substances or toxic marine plankton in quantities capable of directly or indirectly affecting the health quality of food

3.20
clean water
clean seawater and fresh water of a similar quality

3.21
wrapping
the placing of a foodstuff in a wrapper or container in direct contact with the foodstuff concerned, and the wrapper or container itself

3.22
packaging
the placing of one or more wrapped foodstuffs in a second container, and the latter container itself

3.23
hermetically sealed container
a container that is designed and intended to be secure against the entry of hazards

3.24
processing
any action that substantially alters the initial product, including heating, smoking, curing, maturing, drying, marinating, extraction, extrusion or a combination of those processes

3.25
unprocessed products
foodstuffs that have not undergone processing, and includes products that have been divided, parted, severed, sliced, boned, minced, skinned, ground, cut, cleaned, trimmed, husked, milled, chilled, frozen, deep-frozen or thawed

3.26
processed products
foodstuffs resulting from the processing of unprocessed products. These products may contain ingredients that are necessary for their manufacture or to give them specific characteristics

3.27
where necessary; where appropriate; adequate; sufficient
mean respectively where necessary, where appropriate, adequate or sufficient to achieve the objectives of this standard

3.28
risk
a function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard

3.29
risk analysis
a process consisting of three interconnected components: risk assessment, risk management and risk communication

3.30
risk assessment
a scientifically based process consisting of four steps: hazard identification, hazard characterization, exposure assessment and risk characterization

3.31
risk management
the process, distinct from risk assessment, of weighing policy alternatives in consultation with interested parties, considering risk assessment and other legitimate factors, and, if need be, selecting appropriate prevention and control options

3.32
risk communication
the interactive exchange of information and opinions throughout the risk analysis process as regards hazards and risks, risk-related factors and risk perceptions, among risk assessors, risk managers, consumers, feed and food businesses, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management decisions

3.33
hazard
a biological, chemical or physical agent in, or condition of, food or feed with the potential to cause an adverse health effect

3.34
traceability
the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution

3.35
final consumer
the ultimate consumer of a foodstuff who will not use the food as part of any food business operation or activity

3.36
cleaning
the removal of soil, food residue, dirt, grease or other objectionable matter

3.37
contaminant
any biological or chemical agent, foreign matter, or other substances not intentionally added to food which may compromise food safety or suitability

3.38
disinfection
the reduction, by means of chemical agents and/or physical methods, of the number of micro-organisms in the environment, to a level that does not compromise food safety or suitability

3.39
hazard
a biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect

3.40
HACCP
a system which identifies, evaluates, and controls hazards which are significant for food safety

3.41
food handler
any person who directly handles packaged or unpackaged food, food equipment and utensils, or food contact surfaces and is therefore expected to comply with food hygiene requirements

3.42
food safety
assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use

3.43
food suitability
assurance that food is acceptable for human consumption according to its intended use

3.44
product contact
all surfaces that are in contact with the product or the primary package during normal operation

3.45
material/product specification
detailed documented description or enumeration of parameters, including permissible variations and tolerances, which are required to achieve a defined level of acceptability or quality

3.46
food grade
lubricants and heat transfer fluids formulated to be suitable for use in food processes where there may be incidental contact between the lubricant and the food

3.47
cleaning in place (CIP)
system that cleans solely by circulating and/or flowing chemical detergent solutions and water rinses by mechanical means onto and over surfaces to be cleaned

3.48
cleaning out of place (COP)
system where equipment is disassembled and cleaned in a tank or in an automatic washer by circulating a cleaning solution and maintaining a minimum temperature throughout the cleaning cycle

3.49
sanitizing
the process of cleaning, followed by disinfection

3.50
sanitation
all actions dealing with cleaning or maintaining hygienic conditions in an establishment, ranging from cleaning and/or sanitizing of specific equipment to periodic cleaning activities throughout the establishment (including building, structural, and grounds cleaning activities)

3.51
certificate of analysis (COA)
document provided by the supplier which indicates results of specific tests/analysis, including test methodology, performed on a defined lot of the supplier's product

3.52
zoning
demarcation of an area within an establishment where specific operating, hygiene or other practices may be applied to minimize the potential for microbiological
cross contamination

NOTE Examples include: clothing change on entry/exit, positive air pressure, modified traffic flow patterns.

3.53
label
printed matter that is part of the finished product package conveying specific information about the contents of the package, the food ingredients and any storage and preparation requirements

NOTE This includes, but is not limited to:

a) the package itself, printed matter attached to the package, or a sticker used for over-labelling;

b) multi packs which have an inner label on the individual product and an outer combined label for the whole contents.

3.54

product recall

removal of a non-conforming product from the market, trade and warehouses, distribution centres and/or customer warehouses because it does not meet specified standards

3.55

First Expired First Out (FEFO)

stock rotation based on the principle of dispatching earliest expiration dates first

3.56

First In First Out (FIFO)

stock rotation based on the principle of dispatching earliest received products first

4 Hygiene policy

4.1 Introduction

All food business operators must maintain hygiene at an appropriate level. This level will vary depending on the type of product or products produced but must be such, so as to ensure that the food produced is safe to eat. Indeed this is a legal requirement. The requirements of this Code are ancillary to this obligation and are included as a means of eliminating, in as far as possible, sources of possible contamination to food. As contaminated food can be a serious hazard to health it is necessary to have a defined policy for hygiene and to comply with good manufacturing practices.

4.2 General requirement

The management of food business operators shall define and document its policy and commitment to hygiene.

4.3 Specific requirement

i) Food business operators shall have a written policy for hygiene and good manufacturing practices. (This may form part of a total policy statement.)

ii) The policy statement shall contain a commitment to maintain hygiene at an appropriately defined level to ensure the safety of the food produced and to devote adequate resources to achieve this.

iii) The policy statement must be signed by the person or persons who have the ultimate responsibility and authority for defining the company's policy.

5 General hygiene provisions for primary production and associated operations

Objectives:

Primary production shall be managed in a way that ensures that food is safe and suitable for its intended use. Where necessary, this will include:

— avoiding the use of areas where the environment poses a threat to the safety of food;

— controlling contaminants, pests and diseases of animals and plants in such a way as not to pose a threat to food safety;

— adopting practices and measures to ensure food is produced under appropriately hygienic conditions.

Rationale:
To reduce the likelihood of introducing a hazard which may adversely affect the safety of food, or its suitability for consumption, at later stages of the food chain.

5.1 Coverage

This clause applies to primary production and the following associated operations:

a) the transport, storage and handling of primary products at the place of production, provided that this does not substantially alter their nature;

c) the transport of live animals, where this is necessary to achieve the objectives of this standard; and

c) in the case of products of plant origin, fishery products and wild game, transport operations to deliver primary products, the nature of which has not been substantially altered, from the place of production to an establishment.

5.2 Environmental hygiene

Potential sources of contamination from the environment shall be considered. In particular, primary food production shall not be carried on in areas where the presence of potentially harmful substances would lead to an unacceptable level of such substances in food.

5.3 Hygiene provisions

5.3.1 The potential effects of primary production activities on the safety and suitability of food shall be considered at all times. In particular, this includes identifying any specific points in such activities where a high probability of contamination may exist and taking specific measures to minimize that probability. The HACCP-based approach may assist in the taking of such measures — see *Hazard Analysis and Critical Control (HACCP) Point System and Guidelines for its Application* (Annex A).

5.3.2 As far as possible, food business operators shall ensure that primary products are protected against contamination, having regard to any processing that primary products will subsequently undergo.

5.3.3 Notwithstanding the general duty laid down in 5.3.2, food business operators are to comply with appropriate Community and national legislative provisions relating to the control of hazards in primary production and associated operations, including:

a) measures to control contamination arising from the air, soil, water, feed, fertilizers (including natural fertilizers), veterinary medicinal products, plant protection products and biocides and the storage, handling and disposal of waste, and store harmful substances appropriately;

b) measures relating to animal health and welfare and plant health that have implications for human health, or adversely affect the suitability of the product, including programmes for the monitoring and control of zoonoses and zoonotic agents; and

c) measures to protect food sources from faecal and other contamination.

5.4 Handling, storage and transport

a) Procedures shall be in place to:

- sort food and food ingredients to segregate material which is evidently unfit for human consumption;
- dispose of any rejected material in a hygienic manner; and

— protect food and food ingredients from contamination by pests, or by chemical, physical or microbiological contaminants or other objectionable substances during handling, storage and transport.

b) Care shall be taken to prevent, so far as reasonably practicable, deterioration and spoilage through appropriate measures which may include controlling temperature, humidity, and/or other controls.

5.5 Food business operators rearing, harvesting or hunting animals or producing primary products of animal origin shall take adequate measures, as appropriate:

a) to keep any facilities used in connection with primary production and associated operations, including facilities used to store and handle feed, clean and, where necessary after cleaning, to disinfect them in an appropriate manner;

b) to keep clean and, where necessary after cleaning, to disinfect, in an appropriate manner, equipment, containers, crates, vehicles and vessels;

c) as far as possible to ensure the cleanliness of animals going to slaughter and, where necessary, production animals;

d) to use potable water, or clean water, whenever necessary to prevent contamination;

e) to ensure that staff handling foodstuffs are in good health and undergo training on health risks;

f) as far as possible to prevent animals and pests from causing contamination;

g) to store and handle waste and hazardous substances so as to prevent contamination;

h) to prevent the introduction and spread of contagious diseases transmissible to humans through food, including by taking precautionary measures when introducing new animals and reporting suspected outbreaks of such diseases to the competent authority;

i) to take account of the results of any relevant analyses carried out on samples taken from animals or other samples that have importance to human health; and

j) to use feed additives and veterinary medicinal products correctly, as specified by the relevant standards.

5.6 Food business operators producing or harvesting plant products are to take adequate measures, as appropriate:

a) to keep clean and, where necessary after cleaning, to disinfect, in an appropriate manner, facilities, equipment, containers, crates, vehicles and vessels;

b) to ensure, where necessary, hygienic production, transport and storage conditions for, and the cleanliness of, plant products;

c) to use potable water, or clean water, whenever necessary to prevent contamination;

d) to ensure that staff handling foodstuffs are in good health and undergo training on health risks;

e) as far as possible to prevent animals and pests from causing contamination;

f) to store and handle wastes and hazardous substances so as to prevent contamination;

g) to take account of the results of any relevant analyses carried out on samples taken from plants or other samples that have importance to human health; and

h) to use plant protection products and biocides correctly, as specified by the relevant standards.

5.7 Food business operators are to take appropriate remedial action when informed of problems identified during official controls.

5.8 Record-keeping

5.8.1 Food business operators shall keep and retain records relating to measures put in place to control hazards in an appropriate manner and for an appropriate period, commensurate with the nature and size of the food business. Food business operators shall make relevant information contained in these records available to the competent authority and receiving food business operators on request.

5.8.2 Food business operators rearing animals or producing primary products of animal origin shall, in particular, keep records on:

a) the nature and origin of feed fed to the animals;

b) veterinary medicinal products or other treatments administered to the animals, dates of administration and withdrawal periods;

c) the occurrence of diseases that may affect the safety of products of animal origin;

d) the results of any analyses carried out on samples taken from animals or other samples taken for diagnostic purposes, that have importance for human health; and

e) any relevant reports on checks carried out on animals or products of animal origin.

5.8.3 Food business operators producing or harvesting plant products shall, in particular, keep records on:

a) any use of plant protection products and biocides;

b) any occurrence of pests or diseases that may affect the safety of products of plant origin; and

c) the results of any relevant analyses carried out on samples taken from plants or other samples that have importance to human health.

5.8.4 The food business operators may be assisted by other persons, such as veterinarians, agronomists and farm technicians, with the keeping of records.

5.9 Recommendations for guides to good hygiene practice

5.9.1 Guides shall contain guidance on good hygiene practice for the control of hazards in primary production and associated operations.

5.9.2 Guides to good hygiene practice shall include appropriate information on hazards that may arise in primary production and associated operations and actions to control hazards, including relevant measures set out in continental and national legislation or national and continental programmes. Examples of such hazards and measures may include:

a) the control of contamination such as mycotoxins, heavy metals and radioactive material;

b) the use of water, organic waste and fertilizers;

c) the correct and appropriate use of plant protection products and biocides and their traceability;

d) the correct and appropriate use of veterinary medicinal products and feed additives and their traceability;

e) the preparation, storage, use and traceability of feed;

f) the proper disposal of dead animals, waste and litter;

g) protective measures to prevent the introduction of contagious diseases transmissible to humans through food, and any obligation to notify the competent authority;

h) procedures, practices and methods to ensure that food is produced, handled, packed, stored and transported under appropriate hygienic conditions, including effective cleaning and pest-control;

i) measures relating to the cleanliness of slaughter and production animals;

j) measures relating to record-keeping.

6 Establishment: Design and facilities

Objectives:

Depending on the nature of the operations, and the risks associated with them, premises, equipment and facilities shall be located, designed and constructed to ensure that:

- contamination is minimized;
- design and layout permit appropriate maintenance, cleaning and disinfections and minimize air-borne contamination;
- surfaces and materials, in particular those in contact with food, are non-toxic in intended use and, where necessary, suitably durable, and easy to maintain and clean;
- where appropriate, suitable facilities are available for temperature, humidity and other controls; and
- there is effective protection against pest access and harbourage.

Rationale:
Attention to good hygienic design and construction, appropriate location, and the provision of adequate facilities, is necessary to enable hazards to be effectively controlled.

6.1 Location, size, hygienic design and conditions

6.1.1 General requirements

Buildings shall be designed, constructed and maintained in a manner appropriate to the nature of the processing operations to be carried out, the food safety hazards associated with those operations and the potential sources of contamination from the plant environs. Buildings shall be of durable construction which presents no hazard to the product.

6.1.2 Food premises shall be kept clean and maintained in good repair and condition. The location of the food establishment shall be such that the buildings can be kept acceptably free from objectionable odours, smoke, dust and other contamination, in order to comply with the relevant requirements for hygiene and sanitation. Potential sources of contamination need to be considered when deciding where to locate food establishments, as well as the effectiveness of any reasonable measures that might be taken to protect food. Establishments should not be located anywhere where, after considering such protective measures, it is clear that there will remain a threat to food safety or suitability. In particular, establishments shall normally be located away from:

- environmentally polluted areas and industrial activities which pose a serious threat of contaminating food;

- areas subject to flooding unless sufficient safeguards are provided;
- areas prone to infestations of pests;
- areas where wastes, either solid or liquid, cannot be removed effectively.

6.1.3 The layout, design, construction, siting and size of food premises shall be so designed and arranged as to:

a) permit an orderly, uninterrupted flow of production without any cross-flows that could have an adverse effect on the quality of the product;

b) function in accordance with its intended use;

c) permit adequate maintenance, cleaning and/or disinfection, avoid or minimize air-borne contamination, and provide adequate working space to allow for the hygienic performance of all operations;

d) protect against the accumulation of dirt, contact with toxic materials, the shedding of particles into food and the formation of condensation or undesirable mould on surfaces;

e) permit good food hygiene practices, including protection against contamination and, in particular, pest control; and

f) where necessary, provide suitable temperature-controlled handling and storage conditions of sufficient capacity for maintaining foodstuffs at appropriate temperatures and designed to allow those temperatures to be monitored and, where necessary, recorded.

6.1.4 The factory buildings shall be of sound construction, in good repair and large enough to prevent crowding of equipment and employees and to permit adequate cleaning and the maintenance of product quality and hygiene. Adequate working space shall be provided to facilitate acceptable operations. The factory grounds shall be graded to ensure proper drainage. The factory and grounds shall be maintained in a clean and hygienic state and shall be effectively fenced.

6.1.5 The factory and equipment shall be so designed as to permit the processing of raw materials without undue delay. The buildings shall be so designed and constructed as to prevent the entry and harbouring of insects, birds, rodents and other vermin.

6.1.6 The internal design and layout of food establishments shall permit good food hygiene practices, including protection against cross-contamination between and during operations by foodstuffs.

6.1.7 Structures within food establishments shall be soundly built of durable materials and be easy to maintain, clean and where appropriate, able to be disinfected. In particular the following specific conditions shall be satisfied where necessary to protect the safety and suitability of food:

- the surfaces of walls, partitions and floors shall be made of impervious materials with no toxic effect in intended use;
- walls and partitions should have a smooth surface up to a height appropriate to the operation;
- floors shall be constructed to allow adequate drainage and cleaning;
- ceilings and overhead fixtures shall be constructed and finished to minimize the build-up of dirt and condensation, and the shedding of particles;
- windows shall be easy to clean, be constructed to minimize the build-up of dirt and where necessary, be fitted with removable and cleanable insect-proof screens. Where necessary, windows should be fixed;

- doors shall have smooth, non-absorbent surfaces, and be easy to clean and, where necessary, disinfect;

- working surfaces that come into direct contact with food should be in sound condition, durable and easy to clean, maintain and disinfect. They should be made of smooth, non-absorbent materials, and inert to the food, to detergents and disinfectants under normal operating conditions.

6.1.8 An adequate number of flush lavatories are to be available and connected to an effective drainage system. Lavatories are not to open directly into rooms in which food is handled.

6.1.9 An adequate number of washbasins is to be available, suitably located and designated for cleaning hands. Washbasins for cleaning hands are to be provided with hot and cold running water, materials for cleaning hands and for hygienic drying. Where necessary, the facilities for washing food are to be separate from the hand-washing facility.

6.1.10 There is to be suitable and sufficient means of natural or mechanical ventilation. Mechanical airflow from a contaminated area to a clean area is to be avoided. Ventilation systems are to be so constructed as to enable filters and other parts requiring cleaning or replacement to be readily accessible.

6.1.11 Sanitary conveniences are to have adequate natural or mechanical ventilation.

6.1.12 Food premises are to have adequate natural and/or artificial lighting.

6.1.13 Drainage facilities are to be adequate for the purpose intended. They are to be designed and constructed to avoid the risk of contamination. Where drainage channels are fully or partially open, they are to be so designed as to ensure that waste does not flow from a contaminated area towards or into a clean area, in particular an area where foods likely to present a high risk to the final consumer are handled.

6.1.14 Where necessary, adequate changing facilities for personnel are to be provided.

6.1.15 Cleaning agents and disinfectants are not to be stored in areas where food is handled.

6.2 Grounds

a) The site boundaries shall be clearly identified. Access to the site shall be controlled.

b) Equipment pallets, engineering materials, etc. stored in the grounds shall be stored so as not to provide sites for harbourage or breeding of insects, rodents, etc. They shall be stored neatly in a clearly defined area.

c) Litter, waste and refuse shall be stored in suitable containers.

d) Yards, road, etc. within the factory shall be surfaced to avoid excessive dust.

e) Stagnant water, shall be eliminated. Stagnant water can be present in gutters, open drains, potholes and pools and can be caused by inadequate drainage or incorrectly sloped surfaces.

f) Unused buildings, outhouses, service buildings, etc. shall be kept clean and tidy to prevent the establishment of sites for the harbourage and breeding of rodents and insects.

g) Precautions shall be taken to ensure that contamination from trucks and other vehicles is not brought into the factory either by fork truck or by foot.

h) In rural areas, cattle grids or another appropriate system shall be used to prevent cattle from entering the factory grounds.

i) Animals shall not be permitted in the factory grounds, other than when they are used as a raw material.

j) Access to the factory grounds shall be protected by a perimeter fence or wall.

k) The grounds shall be kept free of uncut weeds and grass, litter, waste and miscellaneous materials.

l) Precautions shall be taken to prevent, in as far as possible, birds from nesting or perching in the grounds of the plant — (Regulations in relation to the preservation of wild life shall be complied with.)

m) Yards, outside structures, pathways shall be maintained in a clean condition and in particular shall be kept free of excreta, from birds and animals, to avoid foot borne filth and harmful micro-organisms, such as salmonella, being carried into the plant.

6.3 Roofs and outside structures

a) The roof shall be weatherproof. The roof and ceilings shall be at least 300 mm above any overhead equipment and in no case less than 3 m from the floor.

b) Roofs, valleys and gutters shall be maintained to prevent the damage to food or materials used in the preparation or presentation of food by rainwater and to prevent walls and floors from becoming damp or wet due to rain.

c) Roofs, valleys and gutters shall be kept clear of debris, including insects, dead birds, etc., and shall be inspected at appropriate defined intervals.

d) Outside structures shall be kept clear of debris, bird droppings, etc. as these can lead to the contamination of food.

6.4 Specific requirements in rooms where foodstuffs are prepared, treated or processed

In rooms where food is prepared, treated or processed (excluding dining areas and those premises specified in 6.1, but including rooms contained in means of transport) the design and layout are to permit good food hygiene practices, including protection against contamination between and during operations. In particular:

6.4.1 Walls

a) Outer walls shall be weatherproof and impermeable to water. Wall surfaces are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect. Interior wall surfaces shall be faced with a smooth, hard, impervious, light-coloured material, non-absorbent, washable and non-toxic materials to a height of at least 2 m from the floor. Where foodstuff might come into contact with the walls above this height, the facing shall be continued to that higher level.

b) Above 2 m, the walls shall have a smooth, impervious, washable, light-coloured surface. All ledges that occur in the wall construction shall be sloped at an angle of not less than 45°. The walls shall be free from unnecessary projections. Windowsills shall be at least 1 m above floor level.

c) In the production areas and in freezer storage rooms, the wall-to-wall and wall-to-floor junctions shall be coved, the minimum radius of the coving being 25 mm and 40 mm respectively.

d) Walls shall be free from cobwebs, dampness, condensation and mould.

e) Junctions between walls, and walls, floors and ceilings shall be closed and ideally should be coved.

f) The joints on panelled walls shall be sealed.

g) Wall surfaces likely to come into contact with product shall be suitably protected and if sheeted, the sheeting shall be sealed. The surfaces shall be cleaned at least daily.

h) Horizontal ledges and sills should be avoided and if present shall be kept free from dust and any miscellaneous items.

i) Openings for conveyors, services, vents, etc. shall be smooth and shall be sealed.

j) Where appropriate walls shall be protected from damage by moving equipment; galvanised guard rails or the equivalent shall be used.

k) Walls shall be properly maintained, this shall include the absence of flaking paint, the replacement of damaged tiles, the proper grouting of tiles and the sealing of cracks and joints on internal wall surfaces.

l) Fixtures, signs, switch boxes, etc. should be avoided on internal wall surfaces and where present in processing areas shall be sealed to avoid sites for the accumulation of dirt.

m) Walls shall be maintained in a clean condition.

6.4.2 Floors

a) Floors shall be constructed of concrete or other material that is suitably impermeable, corrosion resistant and easy to clean, washable, easy to disinfect and that has an even surface that is smooth but not slippery, and is free from cracks and open joints. This will require the use of impervious, non-absorbent, washable and non-toxic materials unless food business operators can satisfy the competent authority that other materials used are appropriate. Where appropriate, floors are to allow adequate surface drainage

b) Floors shall be resistant to attack by product spillages, cleaning agents and cleaning solutions.

c) Floors shall be maintained in good condition, free from cracks, holes or corrosion.

d) Floors shall be smooth to aid cleaning subject to the requirement of being safe to walk on when wet, dry or greasy.

e) Floors and drainage channels shall be graded to have a fall of at least 1 in 60 and shall be drained to internal drainage channels that are connected to external sewers via a suitable drain trap. Installations that obstruct flow and cleaning shall not be present in drainage channels. The capacity of drainage channels shall be sufficient to cope with peak loads.

f) Floors and drainage channels shall be in good condition and repair and shall have strainers in place. Internal drainage channels shall be of the open type with, where necessary, removable covers. Where appropriate for safety or other reasons they shall be covered with removable grids which shall be removed and cleaned daily.

g) Concrete floors shall be suitably constructed or sealed to prevent the build-up of dirt or the release of dust.

h) Duckboards should be avoided, but if essential shall be easily cleanable and made of metal or suitable plastics. Wooden duckboards shall not be used.

i) Mezzanine floors, bridges to mezzanine floors and bridges over equipment shall be completely sealed and shall include side walls and walls around openings, where the absence of these requirements could lead to the contamination of machinery or products passing or sited below. Adequate provision shall be made for cleaning.

j) Floors shall be kept clean, free from litter, the accumulation of water, oil, etc. and processing areas shall be cleaned at least daily. In sensitive production areas the floors shall be cleaned with a sterilisation agent.

6.4.3 Ceilings and overheads

a) Ceilings shall be smooth, impervious and easy to clean. Ceilings, and roofs where no ceilings are fitted, shall be faced with a smooth impervious material that is light in colour and capable of being cleaned without damage, and so constructed and finished as to be dustproof and to minimize condensation, mould development, flaking of paint and the lodgement of dirt.

b) Girders, overhead pipework services and structures should be kept to a minimum to aid cleaning, and if present shall be free of dust, rust, mould, flaking paint, cobwebs and extraneous material.

c) False ceilings are ideal for enclosing services, roof structures, etc. If present they shall be smooth and impervious, adequately supported and if appropriate shall be provided with catwalks or other means to facilitate cleaning and enable maintenance to be carried out in the space above the ceiling.

d) Where there is no access to the space above the ceiling, the ceiling shall be totally sealed.

e) Skylights if present shall be clean and free of condensation and shall not open.

f) False ceilings shall not be made with asbestos or made from material likely to disintegrate.

g) Openings in ceilings for conveyors, vents, piping, etc. shall be properly sealed and shall be smooth.

h) Canopies over equipment, air vents and air vent covers and screens shall be kept free of dust and clean. A ceiling shall be provided where the packing media or unprotected cooked product is handled. A ceiling is not required where a canopy covers the entire open product.

i) Ceilings shall be kept free from condensation to prevent the growth of mould and water dropping on the food. This can be achieved by correct air circulation, insulation and the venting of moist air.

j) There shall be in place, a high cleaning programme for the total factory, with special emphasis on the production areas.

k) Where there is internal access to outside roofs and structures, access shall be controlled to prevent food borne filth from being brought into the plant. The access door shall be locked, unless fire regulations require otherwise, and personnel exiting on to roofs shall change their footwear on re-entering the plant.

6.4.4 Doors and windows

a) Doors, windows and window frames shall be maintained in good condition and free from mould, flaking paint, etc. and shall be kept clean.

b) Windows and other openings shall be constructed to prevent the accumulation of dirt. Those which can be opened to the outside environment shall, where necessary, be fitted with insect-proof screens which can be easily removed for cleaning. Where open windows would result in contamination, windows shall remain closed and fixed during production.

c) Doors leading into production areas which are used other than as an emergency exit shall be fitted with a self-closing device, air curtains or plastic strips.

d) Doors and door frames shall be sheathed with, or made from, a suitable corrosion-resistant material that has high impact resistance and, unless they are provided with effective air-screens, they shall, as far as is practicable, be of a self-closing type.

e) External doors shall be kept closed. If this is impracticable, due to frequent use, then overlapping plastic strip curtains, rubber swing doors or an appropriate alternative shall be used.

f) Internal window sills shall have a slope of 45° or in the case of existing premises, window sills, if horizontal, shall be kept free of dust and extraneous material.

g) External doors shall be constructed so as to prevent the entry of rainwater into the factory.

h) Wooden doors should be avoided and if used should be flush doors to prevent the accumulation of dirt, and they shall be coated with a non-toxic, easily cleanable material.

i) Doors and door frames shall have a smooth, seamless, impervious, light-coloured, readily cleanable surface. Chill room, freezer and freezer storage room doors shall be tight-fitting.

j) surfaces (including surfaces of equipment) in areas where foods are handled and in particular those in contact with food shall be maintained in a sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of smooth, washable corrosion-resistant and non-toxic materials, unless food business operators can satisfy the competent authority that other materials used are appropriate.

k) Adequate facilities shall be provided, where necessary, for the cleaning, disinfecting and storage of working utensils and equipment. These facilities shall be constructed of corrosion-resistant materials, be easy to clean and have an adequate supply of hot and cold water.

l) Adequate provision shall be made, where necessary, for washing food. Every sink or other such facility provided for the washing of food is to have an adequate supply of hot and/or cold potable water consistent with the requirements of 8.1.1 and be kept clean and, where necessary, disinfected.

6.4.5 Furnishings

a) Furnishings shall be solidly constructed and in good repair.

b) They shall be clean both inside and outside.

c) They shall ideally be constructed of metal or plastic. If wood or a wood based product is used in their construction, they shall have a finish which is non toxic and easy to clean.

d) They shall be ventilated where necessary.

e) The top of furnishings shall be kept free of dust and extraneous material and where appropriate should be sloped.

6.4.6 Lift cages and staircases

a) Lift cages shall have a smooth, impervious, corrosion-resistant inside surface and lift shafts shall be properly drained and shall be accessible for cleaning. Staircases in rooms where food is processed or handled shall have solid risers, and shall be provided with solid balustrades of height at least 1 m above the nosing of each stead.

6.4.7 Recommendations

a) Kerbs if used around wet areas, should be coved on both sides and ideally should have a rounded top.

b) Care should be taken in designing ceiling heights as low ceilings can lead to condensation and high ceilings are difficult to maintain.

c) Access to outside roofs and structures from inside the plant should be avoided as roofs often contain bird droppings which can be contaminated with salmonella or other food poisoning micro-organisms.

d) Windows in processing areas should be doubly glazed or double windows should be installed to prevent condensation and they should be mounted flush to the internal wall surface to avoid ledges.

e) Shatter proof material should be used instead of glass in areas where broken glass could contaminate the food.

f) Personnel entrances to processing areas should have two doors with a lobby between, which should contain hand washing facilities and storage for clean protective clothing.

g) Wall tiles are not recommended, as the area behind the tiles can be used for breeding by insects if there is a failure of the tile grouting. Tiled walls should only be used where they are specified in regulations.

h) There should be a wide path at least one metre wide around the factory so as to reduce the chance of rodent infestation and it should be kept clean and clear of materials.

i) In landscaping the area around a factory, care should be taken, and trees, particularly deciduous trees should be avoided as rotting leaves can be a sources of mould and trees can give harbourage to birds.

6.4.8 Cables and pipes

Cables and pipes shall, where applicable, be

a) fixed above ceilings, or

b) chased into walls, or

c) fixed away from walls and ceilings and above the floor, and spaced in such a manner that the ceilings, walls, floor, cables and pipes can be easily cleaned and maintained in a hygienic condition, or

d) carried under the floor.

Overhead pipes and cable connections to machines that cannot be fixed above the ceiling shall be carried a minimum of 40 mm apart on tubular brackets suspended at least 40 mm away from the ceiling. Waste pipes and other pipes that cannot be chased into walls, shall be fixed at least 40 mm from the wall surfaces and 150 mm above the floor and spaced at least 40 mm apart. Pipes in which the product is conveyed, shall have no dead ends.

6.4.9 Illumination

General illumination shall be such as to permit efficient operations during the manufacture, production, processing or treatment of the product. Artificial illumination, if used, shall be such that the colours of products are not significantly altered. Luminaires suspended over the work areas where the product is handled at any stage during preparation shall be of the safety type or otherwise be so protected as to prevent contamination of the product in the event of breakage of a luminaire or lamp.

6.4.10 Ventilation

The ventilation shall be such that it keeps the air fresh and removes excess water vapour, and that it prevents the build-up of excessive heat, the formation of condensate and the growth of mould on overhead structures. The air shall be free from noxious fumes, vapours, dust and contaminating aerosols. The air flow shall be from the more hygienic to the less hygienic areas. Natural ventilation shall be augmented, where necessary, by mechanical means.

Windows that open for ventilation purposes shall be insect-screened. The screens shall be easily removable for cleaning, and shall be made of suitable corrosion-resistant material.

6.4.11 Hand-washing facilities

The following shall be provided at those entrances to the preparation and processing areas of the factory that are used by the employees, and at other conveniently situated places in the preparation and processing areas of the factory, within easy reach of the employees, and at the exits of the toilets:

a) an acceptable number of wash-hand basins, with an abundant supply of cold and hot or warm running potable water in the temperature range 40 °C to 50 °C, that complies with the requirements of 8.1.1;

b) an ample supply of unscented liquid soap or acceptable detergent in active condition;

c) disposable paper towels;

d) receptacles for used towels; and

e) taps operated by means other than the hands or elbows, for example knee-operated or foot-operated taps, or push-button taps with pre-set volume control.

Disinfectant hand dips, where provided, shall be of such a design that they can be adequately cleaned. Access to hand-washing facilities shall at all times be unobstructed.

6.4.12 Footbaths

Unless their absence in particular circumstances is acceptable, or unless alternative acceptable cleaning and disinfecting facilities are provided, footbaths that contain a suitable disinfectant solution shall be provided at each entrance to the preparation, processing and packaging areas that is used by employees, and shall be so located that employees cannot obtain access to those areas without disinfecting their footwear. Footbaths shall be so constructed that they can be adequately drained and cleaned.

6.4.13 Notices

Notices shall be strategically displayed in the preparation, processing, packaging and storage areas, in the changerooms and in the toilet facilities. The notices shall require that hands be washed with soap or detergent and shall indicate that spitting, the use of chewing gum and the use of tobacco in any form, and the taking of refreshments or food are prohibited in these areas.

6.4.14 Production areas

Production areas shall be so designed, equipped and staffed as to allow free movement of workers and to facilitate the free movement and cleaning of movable equipment. Areas where raw food is being handled shall be separated from areas where cooked food is being handled.

6.4.15 Chill, freezer and freezer storage facilities

Chill, freezer and freezer storage facilities shall operate efficiently and shall be hygienically maintained. Freezer storage rooms shall, as far as possible, be equipped with automatic temperature recording systems. Products shall not be stacked direct on the floors, against walls or against wall panels. Walls and floors shall have a smooth finish and shall be impervious to moisture, and measures shall be taken to prevent the flaking off of surface material from ceilings and walls. Brick walls shall be plastered.

6.4.16 Laboratory facilities

In-line and on-line test facilities shall be controlled to minimize risk of product contamination. Microbiology laboratories shall be designed, located and operated so as to prevent contamination of people, plant and products. They shall not open directly onto a production area.

6.5 Storage facilities

6.5.1 Storage facilities for edible ingredients

Storage facilities for edible ingredients that are used in the preparation of the frozen product shall be dry, free from dust and any other source of contamination, and verminproof. Edible ingredients shall be stored in closed containers and away from the floor and the walls.

6.5.2 Storage facilities for non-edible materials

Non-edible materials shall be stored in a room separate from other storage rooms and from the production area of the factory.

6.5.3 Storage facilities for packing and packaging materials

Materials for the packing and packaging of the product shall be stored at a height of at least 250 mm above floor level, in clean, dustproof, verminproof and dry storerooms reserved for the purpose. Packaging materials shall be stored away from the floor and walls.

6.5.4 Storage facilities for poisonous and other harmful materials

6.5.4.1 Storage facilities for pesticides or other poisonous and harmful materials

Pesticides or other poisonous and harmful materials and the equipment for their application shall be stored in a well-ventilated room in which no foodstuff, food-handling equipment, packaging material or containers are stored and that is kept locked. All dangerous materials shall be prominently and distinctly labelled and shall at no time come into contact with containers, packaging materials, raw materials or the product or product-contact surfaces.

6.5.4.2 Storage facilities for cleaning and disinfecting materials

Cleaning and disinfecting materials and the equipment for their application shall be stored in a room in which no foodstuff, food-handling equipment, packaging material or containers are stored and shall at no time come into contact with containers, packaging materials, raw materials or the product All cleaning and disinfecting materials shall be prominently and distinctly labelled.

6.5.5 Storage facilities for utensils and spare parts

Utensils and spare parts that, when in use, come into contact with the product shall, when not in use, be kept in a disinfectant solution or stored in a hygienic way in a dry area that is free from dust and any other source of contamination, and that is verminproof. Spare parts for machinery that are capable of contaminating the product shall be kept in a separate storage area away from the processing areas.

6.5.6 Fuel storage area

Any storage area or tanks for the storage of fuels such as coal or hydrocarbons, shall be designed, protected, controlled and maintained in such a way as to prevent the product from being polluted during the storage and manipulation of these fuels.

6.5.7 Storage facilities for lubricants

Lubricants shall be stored away from the production area and in such a way that they do not cause contamination of the product

6.5.8 Storage facilities for finished products

Finished products awaiting dispatch shall be stacked away from the floors and walls, in well-ventilated, acceptably dust-free, dry and clean rooms. The storage area for finished products shall be physically separated from areas where steam is generated. The finished product shall be protected against elements of the environment or any other condition that could adversely affect the product

Finished products found not to comply with the requirements of this standard shall be stacked apart from finished products that comply with the requirements.

6.6 Smoke units

Smoke units shall be maintained in a hygienic condition and they shall not be fired from the inside of the processing area of the factory. In the case of prefabricated smoke kilns where the smoke-generating equipment forms part of the kiln, the smoke generator shall not emit any smoke into the processing area, and the area adjacent to such a generator shall be so partitioned off from the processing area as to prevent contamination of the area with sawdust. Sawdust shall be contained in bins with lids on. Doors of smoke rooms and kilns shall be tight-fitting. The inner surfaces of smoke units shall be finished with a smooth lining such as stainless metal, to facilitate the cleaning of the walls with steam and water. Trolleys or trays used in smoke units shall be of hygienic design and shall be regularly cleaned.

6.7 By-products

Any processing of by-products and non-meat products that are not intended for human consumption shall be conducted in buildings that are physically separated from the factory in such a way that there is no possibility of contamination of the product. Equipment and utensils used in by-product plants shall be identified and shall not be used in areas where food for human consumption is processed.

6.8 Food waste

6.8.1 Food waste, non-edible by-products and other refuse are to be removed from rooms where food is present as quickly as possible, so as to avoid their accumulation.

6.8.2 Food waste, non-edible by-products and other refuse are to be deposited in closable containers, unless food business operators can demonstrate to the competent authority that other types of containers or evacuation systems used are appropriate. These containers are to be of an appropriate construction, kept in sound condition, be easy to clean and, where necessary, to disinfect.

6.8.3 Adequate provision is to be made for the storage and disposal of food waste, non-edible by-products and other refuse. Refuse stores are to be designed and managed in such a way as to enable them to be kept clean and, where necessary, free of animals and pests.

6.8.4 All waste is to be eliminated in a hygienic and environmentally friendly way in accordance with Community legislation applicable to that effect, and is not to constitute a direct or indirect source of contamination.

6.9 Comfort facilities

6.9.1 Where the comfort facilities are connected with food handling or storage areas by means of a vestibule only, the fall of the floor surfaces of the comfort facilities shall be such that no water from the floor surfaces can enter the food handling or storage areas. An acceptable number of suitable changerooms, shower baths, wash-hand basins with taps that operate as described in 6.4.11 (e), toilets (separate for each sex) and, where appropriate, urinals, shall be provided within practical distance from the factory processing areas. Shower baths shall connect direct to the changerooms. Comfort facilities shall not open direct into a preparation, processing, packaging or storage area unless it is provided with a vestibule. The doors of such a vestibule shall be close-fitting and self-closing. The entry from such a vestibule into the preparation, processing, packing or storage areas shall be equipped with a footbath.

6.9.2 Toilets shall be completely separate from changerooms, the only permissible access being through a vestibule with close-fitting, self-closing doors. Toilet blocks shall have their own hand-washing facilities, separated from those provided in changerooms. An ample supply of toilet paper, hot and cold running water, nailbrushes, unscented liquid soap or an acceptable detergent solution and disposable paper towels shall be available to employees. Receptacles shall be provided for used towels. Refuse bins of hygienic construction shall be provided.

6.9.3 Notices shall be posted that require employees to wash their hands with soap or detergent after they have used the toilet. Lockers or controlled clothes baskets shall be provided, and the layout and equipment shall be such as to permit proper cleaning and maintenance. The comfort facilities shall be kept clean and tidy. The comfort facilities shall be adequately ventilated. Provision shall be made for proper drainage of the floor surfaces of the comfort facilities. Changerooms and dressing-rooms shall not be used as living quarters or for the preparation of meals. Staff dining-rooms shall be separate from the changerooms or dressing-rooms.

6.10 Facilities for cleaning and disinfecting portable equipment

Facilities with proper drainage shall be provided for the cleaning and disinfecting of portable equipment. Such facilities shall be located in a separate room or in a designated area in the preparation, processing and packaging areas where there is an ample supply of cold potable water under adequate pressure that complies with the requirements of 8.1.1, and, where necessary, hot water or saturated steam under adequate pressure. The room or area to be used shall be such that there will be no risk of contamination of the product or product contact surfaces. The floor of the room or area shall be smooth-surfaced and graded to facilitate proper disposal of waste liquids from the cleaning process. The direction of drainage flow shall be away from the handling areas.

6.11 Temporary/mobile premises and vending machines

6.11.1 Premises and structures covered here include market stalls, mobile sales and street vending vehicles, temporary premises in which food is handled such as tents and marquees.

6.11.2 Premises and vending machines shall, so far as is reasonably practicable, be so sited, designed, constructed and kept clean and maintained in good repair and condition as to avoid the risk of contamination, in particular by animals and pests.

6.11.3 In particular, where necessary:

a) appropriate facilities shall be available to maintain adequate personal hygiene (including facilities for the hygienic washing and drying of hands, hygienic sanitary arrangements and changing facilities);

b) surfaces in contact with food shall be in a sound condition and be easy to clean and, where necessary, to disinfect. This will require the use of smooth, washable, corrosion-resistant and non-toxic materials, unless food business operators can satisfy the competent authority that other materials used are appropriate;

c) adequate provision shall be made for the cleaning and, where necessary, disinfecting of working utensils and equipment;

d) where foodstuffs are cleaned as part of the food business' operations, adequate provision shall be made for this to be undertaken hygienically;

e) an adequate supply of hot and/or cold potable water shall be available;

f) adequate arrangements and/or facilities for the hygienic storage and disposal of hazardous and/or inedible substances and waste (whether liquid or solid) shall be available;

g) adequate facilities and/or arrangements for maintaining and monitoring suitable food temperature conditions shall be available;

h) foodstuffs shall be so placed as to avoid the risk of contamination so far as is reasonably practicable.

6.11.4 In applying these specific conditions and requirements, any food hygiene hazards associated with such facilities shall be adequately controlled to ensure the safety and suitability of food.

7 Plant and equipment

7.1 Design and installation

7.1.1 Processing areas shall be so designed, equipped and staffed as to allow free movement of workers, to facilitate cleaning and the maintenance of both hygiene and product quality. Ideally, new plant should be designed so that corners are eliminated by coving and all parts are accessible for cleaning and inspection. As the cost of cleaning can be significant, poorly designed plant and equipment can increase the cost of cleaning.

7.1.2 All plant, equipment and utensils that come into contact with the product shall be smooth-surfaced, light-coloured and of a suitable corrosion-resistant material (other than wood or other absorbent or porous material), which may have an acceptable plastics-coated surface suitable for use with food, but should preferably be stainless steel. They shall be of hygienic design with no open joints or crevices and shall be so constructed as to facilitate their cleaning and disinfecting. Plant and equipment shall be so designed as to facilitate the cleaning and disinfecting of the areas under them. Open ends and curled edges shall be satisfactorily sealed to prevent the accumulation of organic material and dirt. Where necessary, as in the case of equipment that cannot be cleaned *in situ,* it shall be possible to dismantle the equipment for cleaning and disinfecting. Surfaces with which the product comes into contact shall not be painted.

7.1.3 All parts of stationary equipment or of equipment that is not readily movable shall be installed away from the walls and ceilings at distances sufficient to allow access for cleaning and inspection. All permanently mounted equipment shall be either installed high enough above the floor to allow access for cleaning and inspection, or shall be completely sealed to the floor.

7.1.4 Equipment shall preferably not be sunk into the floor but if this is unavoidable, the installation of the equipment shall be such that the equipment is accessible for proper cleaning. Sunken areas shall be well drained.

Copper, lead and their alloys, and other metals or materials detrimental to health, shall not be used in the construction of equipment that comes into contact with the raw materials or with the unprotected product at any stage of its processing. Equipment and utensils used for inedible materials or for waste shall be identified as such and shall not be used for edible products. Equipment used in areas outside the food handling areas, such as in the toilet or ablution facilities, shall not be used in the areas for the processing of food for human consumption.

7.1.5 All articles, fittings and equipment with which food comes into contact shall:

a) be effectively cleaned and, where necessary, disinfected. Cleaning and disinfection are to take place at a frequency sufficient to avoid any risk of contamination;

b) be so constructed, be of such materials and be kept in such good order, repair and condition as to minimize any risk of contamination;

c) with the exception of non-returnable containers and packaging, be so constructed, be of such materials and be kept in such good order, repair and condition as to enable them to be kept clean and, where necessary, to be disinfected; and

d) be installed in such a manner as to allow adequate cleaning of the equipment and the surrounding area.

7.1.6 Where necessary, equipment shall be fitted with any appropriate control device to guarantee fulfilment of this Code’s objectives.

7.1.7 Where chemical additives have to be used to prevent corrosion of equipment and containers, they are to be used in accordance with good practice.

7.2 Equipment for the packing medium

Pipes, valves, joints, pumps or any equipment that comes into contact with the packing medium, shall be of a hygienic design, with no dead ends, sharp bends or uneven joints. Pipelines shall be easily dismantled for cleaning. Mixing equipment, stirrers, mesh screens and storage tanks shall be of stainless steel. Storage tanks shall be provided with suitable covers.

Water used in the mixing tanks shall only be supplied by means of permanently fixed water pipes. Water hoses shall not be used to supply water as an ingredient for the product.

7.3 Specific requirements

a) Product contact surfaces shall be smooth, impervious, non-toxic, non-absorbant, shall be inert to attack by the food processed or the cleaning agents used, must be corrosion resistant and suitable for food use.

b) Dissimilar metal shall not be used where electrolytic corrosion can take place.

c) Dead ends in pipework shall not be present as these cannot be adequately cleaned.

d) Storage and blending vessels shall be fitted with suitable close fitting covers which must be kept in place at all times.

e) Plant and equipment shall be inspected at appropriate intervals for the presence of cracks and if found they shall be repaired. Micro-organisms can grow in cracks and not be killed by normal cleaning procedures.

f) Bearings inside and outside the product zones shall not be excessively lubricated and leaking oil seals shall be repaired.

g) Where required motors shall be fitted with oil catch trays. This shall apply to all motors where oil leaks could enter the food unless food grade lubricants are used.

h) Sieves and filters must be regularly checked and shall be included in the cleaning programme, where applicable.

i) Pumps used for food shall be regularly stripped down. The frequency of stripping down shall be stated in the cleaning programme.

j) Where appropriate pipework shall be of sterilizable quality and open ended pipes shall be fitted with caps or other means to prevent contamination. Where appropriate open ended pipes shall be self-draining.

k) Feed conveyors to and from filling machines and closing machines shall have suitable covers to protect the open food containers and product from overhead contamination, where this is appropriate.

l) Food conveyors lubricated with water, soap solutions or food grade lubricants shall be fitted with a catch tray.

m) Reasonable access under, inside and around plant and equipment shall be provided for servicing and cleaning. Plant and equipment may be mounted directly on walls or floors provided it is adequately sealed to prevent the establishment of sites for the breeding and harbourage of insects and rodents.

n) Containers used for the transport of unpacked food within the factory shall be controlled, to prevent it being used for the transport of raw product and without an adequate cleaning being then used for processed product thus causing cross contamination.

7.4 Recommendations

a) Conveyors, conveying food, open food containers whether full or empty and caps, lids or closures should be covered to prevent contamination of the food or materials in contact with food. The covers and conveyors should be designed to facilitate cleaning.

b) Covers and the top of plant and equipment should not be flat. This aids cleaning and prevents materials being left on top of the plant.

c) Nuts, screws, bolts, etc. if used should be of the self-locking type and suitable precautions should be taken to ensure that they do not interrupt the smooth finish of the plant or equipment.

d) When plant or equipment is being purchased due consideration should be given to ensure that it is of a hygienic design.

e) Containers used for the transport of unpacked food within the factory should be colour coded with different colours for containers used for raw and processed product.

f) A separate set of maintenance tools should be reserved for use in high risk processing areas.

7.5 Tables

Wooden tables shall not be used in processing areas. Table frames shall be of a design and construction that will not allow the development of unhygienic conditions and bacterial build-up. The frames shall be made of smooth, corrosion-resistant metal or shall have been so coated as to protect them from corrosion. Table tops shall be of seamless stainless metal or other seamless, corrosion-resistant, smooth, impermeable material that possesses similar surface characteristics. They shall be of hygienic construction and shall be either removable for cleaning, or so secured to their frames as to allow cleaning and disinfecting. Where metal tops are folded at the edges, the folds shall be so soldered, welded or sealed with an acceptable mastic sealant as to prevent the accumulation of organic matter and dirt. All table tops shall allow rapid and effective drainage, and shall be free from cracks and crevices. All joints in tables shall have been made watertight.

7.6 Cutting boards

If cutting boards are used, they shall be of hygienic construction and shall be made of acceptable light-coloured material (other than wood or other absorbent or porous material), suitable for use with food. Cutting boards shall be easily removable.

7.7 Utensils

Utensils used for the topping-up of cans shall be made of stainless metal or of rigid plastics material and shall be of hygienic design. They shall be provided with acceptable handles. Knives and other utensils shall not have handles of wood or other porous or absorbent material.

7.8 Heat processing equipment

All heat-processing equipment shall be maintained in good order and shall be fitted with temperature control mechanisms, thermometers and pressure gauges. The temperature control mechanisms, thermometers and pressure gauges of heat-processing equipment shall be calibrated regularly (at least once a year) and the calibration certificates shall be available to the relevant authorities. Each steam retort shall be equipped with the following fittings:

a) a controller, that is either manually or mechanically operated, to maintain the processing temperature accurately;

b) at least one indicating mercury-in-glass thermometer, easily readable to 0.5 °C;

c) a recording thermometer and time-temperature charts, that are installed in such a way that their proper operation is not affected by steam or vibration;

d) a pressure gauge, that is connected to the retort by means of a gauge siphon or gooseneck;

e) a vent or vents that have a tap or taps in the top of the retort, with unobstructive discharging to the atmosphere;

f) a bleeder in each thermometer pocket;

g) at least one bleeder in the top of the retort;

h) where an automatic controller is used, a steam by-pass around the controller to make a rapid, even rise to the processing temperature; and

i) an effective safety valve.

The bleeders referred to in f) and g) above shall remain open during the heat-processing period. The bleeders and vent(s) referred to in e), f) and g) above shall discharge unobstructively to the atmosphere. The number and size and the position(s) of the vent(s) shall be sufficient to ensure complete removal of air from the retort before the vent(s) is/are closed, and shall also be sufficient to ensure a uniform steam distribution when process temperature has been attained.

The steam supply and steam distribution in the retort shall be such as to ensure adequate heat treatment. The distribution of steam in the retort shall ensure a rapid and even rise of the temperature of the contents to the desired temperature. The steam supply into the retort shall be sufficient to ensure complete removal of air during this venting.

A fixed wall clock for the recording of time in 1 min graduations (a wrist watch shall not be used), and also the thermometers and pressure gauge referred to in (b), (c) and (d) above, shall be so installed that they are readable from one position.

Retort baskets that contain unprocessed products shall be so identified as to obviate confusion between such retort baskets and those containing processed products. The construction of retort baskets or retort trolleys shall be such that the circulation of steam will not be obstructed. Any suppliers of compressed air or water (or both) shall be capable of shutting off adequately to prevent any leakage into the retort, and so to prevent an adverse effect on the process.

7.9 Containers (bins)

All containers that contain foodstuffs, other than those that contain the finished product and sealed cans in retort baskets, shall at all times be kept on shelves or stands of corrosion-resistant impervious material at a height of at least 250 mm above floor level. Containers that contain food materials shall not be stacked one upon the other in such a way that the contents of one container can be contaminated by the bottom of another container. Containers shall be of hygienic design and light-coloured or shall have a bright metal finish.

7.10 Disinfecting and cleaning facilities

Disinfecting facilities for gloves and knives shall be available at convenient and acceptable points.

7.11 Ice-making equipment

All surfaces of ice-making equipment that come into contact with the ice shall be of suitable corrosion-resistant material. The ice-making equipment shall be of hygienic construction throughout. Whenever ice is transfered, stored or transported, it shall be effectively protected from contamination.

7.12 Compressed air, gases and steam

Compressed air, gases and steam used in direct or indirect contact with food or with food-contact surfaces shall contain no substances that could be hazardous to health or that could contaminate the food.

7.13 Equipment

7.13.1 General

Equipment and containers (other than once-only use containers and packaging) coming into contact with food, should be designed and constructed to ensure that, where necessary, they can be adequately cleaned, disinfected and maintained to avoid the contamination of food. Equipment and containers should be made of materials with no toxic effect in intended use. Where necessary, equipment should be durable and movable or capable of being disassembled to allow for maintenance, cleaning, disinfection, monitoring and, for example, to facilitate inspection for pests.

Contact surfaces shall not affect, or be affected by, the intended product or cleaning system.

7.13.2 Hygienic design

Equipment shall be able to meet established principles of hygienic design, including:

a) smooth, accessible, cleanable surfaces, self draining in wet process areas;

b) use of materials compatible with intended products and cleaning or flushing agents;

c) framework not penetrated by holes or nuts and bolts.

Piping and ductwork shall be cleanable, drainable, and with no dead ends.

Equipment shall be designed to minimize contact between the operator's hands and the products.

7.13.3 Product contact surfaces

Product contact surfaces shall be constructed from materials designed for food use. They shall be impermeable and rust or corrosion free.

7.13.4 Temperature control and monitoring equipment

Equipment used for thermal processes shall be able to meet the temperature gradient and holding conditions given in relevant product specifications. Equipment shall provide for the monitoring and control of the temperature.

7.13.5 Cleaning plant, utensils and equipment

Wet and dry cleaning programmes shall be documented to ensure that all plant, utensils and equipment are cleaned at defined frequencies.

The programmes shall specify what is to be cleaned (including drains), the responsibility, the method of cleaning (e.g. CIP/COP), the use of dedicated cleaning tools, removal or disassembly requirements and methods for verifying the effectiveness of the cleaning.

7.13.6 Preventive and corrective maintenance

A preventive maintenance programme shall be in place.

The preventive maintenance programme shall include all devices used to monitor and/or control food safety hazards.

NOTE Examples of such devices include screens and filters (including air filters), magnets, metal detectors and X-ray detectors.

Corrective maintenance shall be carried out in such a way that production on adjoining lines or equipment is not at risk of contamination.

Maintenance requests which impact product safety shall be given priority.

Temporary fixes shall not put product safety at risk. A request for replacement by a permanent repair shall be included in the maintenance schedule.

Lubricants and heat transfer fluids shall be food grade where there is a risk of direct or indirect contact with the product.

The procedure for releasing maintained equipment back to production shall include clean up, sanitizing, where specified in process sanitation procedures, and pre-use inspection.

Local area PRP requirements shall apply to maintenance areas and maintenance activities in process areas. Maintenance personnel shall be trained in the product hazards associated with their activities.

7.13.7 Food control and monitoring equipment

In addition to the general requirements in 7.13.1, equipment used to cook, heat treat, cool, store or freeze food should be designed to achieve the required food temperatures as rapidly as necessary in the interests of food safety and suitability, and maintain them effectively. Such equipment should also be designed to allow temperatures to be monitored and controlled. Where necessary, such equipment should have effective means of controlling and monitoring humidity, air-flow and any other characteristic likely to have a detrimental effect on the safety or suitability of food. These requirements are intended to ensure that:

- harmful or undesirable micro-organisms or their toxins are eliminated or reduced to safe levels or their survival and growth are effectively controlled;
- where appropriate, critical limits established in HACCP-based plans can be monitored; and
- temperatures and other conditions necessary to food safety and suitability can be rapidly achieved and maintained.

7.13.8 Containers for waste and inedible substances

Containers for waste, by-products and inedible or dangerous substances, should be specifically identifiable, suitably constructed and, where appropriate, made of impervious material. Containers used to hold dangerous substances should be identified and, where appropriate, be lockable to prevent malicious or accidental contamination of food.

8 Utilities: Air, water, energy

The provision and distribution routes for utilities to and around processing and storage areas shall be designed to minimize the risk of product contamination. Utilities' quality shall be monitored to minimize product contamination risk.

8.1 Water supply

8.1.1 Potable water

Every processing plant shall have an adequate supply of clean potable water that is free from suspended matter and from substances that could be deleterious to the product or harmful to health. In addition, the water shall have been so treated, by flocculation, filtration, chlorination or other acceptable process, as to ensure compliance with the following requirements:

a) total count: the total count of viable micro-organisms shall not exceed 100 per ml;

b) coliform organisms: The count of coliform organisms shall not exceed five organisms per 100 ml of the water; and

c) faecal colifonn bacteria: Faecal coliform bacteria shall not be detectable in 100 ml of the water.

8.1.1.1 For the purposes of the water examination, the coliform group shall include all Gram-negative, non-spore-forming rods that are capable of fermenting lactose with the production of acid and gas at 37 °C in less than 48 h. Faecal coliform bacteria shall be regarded as Gram-negative, non-spore-forming rods that are capable of fermenting lactose with the production of acid and gas at both 37 °C and 44 °C in less than 48 h, and of producing indole in tryptone water.

8.1.1.2 Chlorinated water that could have any deleterious effect on the product shall be dechlorinated immediately before use. In all cases, the free residual chlorine concentration shall be determined by the N,N-diethyl-1 ,4-l-phenylenediamine test or other acceptable test that has equivalent sensitivity.

8.1.1.3 Clean water may be used with whole fishery products. Clean seawater may be used with live bivalve molluscs, echinoderms, tunicates and marine gastropods; clean water may also be used for external washing. When such water is used, adequate facilities are to be available for its supply.

8.1.2 Chlorination of water for container cooling

Water that is used for container cooling but is not recirculated shall be continuously chlorinated to contain a minimum of 2 mg/ℓ of free residual chlorine measured at the retort inlet. Where water for container cooling is recirculated, it shall, before recirculation, be treated to remove solids and then, after cooling, be chlorinated to ensure a minimum free residual chlorine content of 2 mg/ℓ at the retort inlet after a contact period of at least 20 min. In all cases, the free residual chlorine concentration shall be determined by the N,N-diethyl-1.4-ℓ-phenylenediamine test or other acceptable test of equivalent sensitivity .

Recirculated container cooling water shall be protected against contamination.

8.1.3 Steam

Steam used in direct contact with food or with food-contact surfaces shall be made from potable water and shall not contain substances that could be hazardous to health or that could contaminate the food.

8.1.4 Ice

8.1.4.1 The purity of ice shall be such that the water derived from it (by melting the ice under aseptic conditions at a temperature not higher than 10 °C) immediately after the ice has been manufactured, complies with the requirements of 8.1.1.

8.1.4.2 Ice which comes into contact with food or which may contaminate food is to be made from potable water or, when used to chill whole fishery products, clean water. It is to be made, handled and stored under conditions that protect it from contamination.

8.1.5 Non-potable water

8.1.5.1 Where non-potable water is used, for example for fire control, steam production, refrigeration and other similar purposes, it is to circulate in a separate duly identified system. Non-potable water is not to connect with, or allow reflux into, potable water systems.

8.1.5.2 Non-potable water shall be carried in completely separate lines with no cross-connection with, or back-siphonage into, the system that carries potable water. Non-potable water lines shall be identified as such and the water shall be considered unsafe and shall not be used for drinking or for use in food or in food handling areas or allowed to come into contact with food-contact surfaces or for hand washing purposes.

8.1.6 Recycled water used in processing or as an ingredient is not to present a risk of contamination. It is to be of the same standard as potable water, unless the competent authority is satisfied that the quality of the water cannot affect the wholesomeness of the foodstuff in its finished form.

8.1.7 Where heat treatment is applied to foodstuffs in hermetically sealed containers it shall be ensured that water used to cool the containers after heat treatment is not a source of contamination for the foodstuff.

8.2 Drainage and waste disposal

Adequate drainage and waste disposal systems and facilities should be provided. They should be designed and constructed so that the risk of contaminating food or the potable water supply is avoided.

8.3 Boiler chemicals

Boiler chemicals, if used, shall be either:

a) approved food additives which meet relevant additive specifications; or

b) additives which have been approved by the relevant regulatory authority as safe for use in water intended for human consumption.

Boiler chemicals shall be stored in a separate, secure (locked or otherwise access controlled) area when not in immediate use.

8.4 Cleaning

Adequate facilities, suitably designated, should be provided for cleaning food, utensils and equipment. Such facilities should have an adequate supply of hot and cold potable water where appropriate.

8.5 Personnel hygiene facilities and toilets

Personnel hygiene facilities should be available to ensure that an appropriate degree of personal hygiene can be maintained and to avoid contaminating food.

Where appropriate, facilities should include:

— adequate means of hygienically washing and drying hands, including wash basins and a supply of hot and cold (or suitably temperature controlled) water;

— lavatories of appropriate hygienic design; and

— adequate changing facilities for personnel.

Such facilities should be suitably located and designated.

8.6 Temperature control

Depending on the nature of the food operations undertaken, adequate facilities should be available for heating, cooling, cooking, refrigerating and freezing food, for storing refrigerated or frozen foods, monitoring food temperatures, and when necessary, controlling ambient temperatures to ensure the safety and suitability of food.

8.7 Air quality and ventilation

The organization shall establish requirements for filtration, humidity (RH%) and microbiology of air used as an ingredient or for direct product contact. Where temperature and/or humidity are deemed critical by the organization, a control system shall be put in place and monitored.

Ventilation (natural or mechanical) shall be provided to remove excess or unwanted steam, dust and odours, and to facilitate drying after wet cleaning, and also to:

— minimize air-borne contamination of food, for example, from aerosols and condensation droplets;

— control ambient temperatures;

— control odours which might affect the suitability of food; and

— control humidity, where necessary, to ensure the safety and suitability of food.

Room air supply quality shall be controlled to minimize risk from airborne microbiological contamination. Protocols for air quality monitoring and control shall be established in areas where products which support growth or survival are exposed.

Ventilation systems shall be designed and constructed such that air does not flow from contaminated or raw areas to clean areas. Specified air pressure differentials shall be maintained. Systems shall be accessible for cleaning, filter changing and maintenance.

Exterior air intake ports shall be examined periodically for physical integrity.

8.8 Compressed air and other gases

Compressed air, carbon dioxide, nitrogen and other gas systems used in manufacturing and/or filling shall be constructed and maintained so as to prevent contamination.

Gases intended for direct or incidental product contact (including those used for transporting, blowing or drying materials, products or equipment) shall be from a source approved for food contact use, filtered to remove dust, oil and water.

Where oil is used for compressors and there is potential for the air to come into contact with the product, the oil used shall be food grade.

NOTE Use of oil free compressors is recommended.

Requirements for filtration, humidity (RH%) and microbiology shall be specified.

NOTE Filtration of the air should be as close to the point of use as is practicable.

8.9 Lighting

Adequate natural or artificial lighting should be provided to enable the undertaking to operate in a hygienic manner. Where necessary, lighting should not be such that the resulting colour is misleading. The intensity should be adequate to the nature of the operation. Lighting fixtures should, where appropriate, be protected to ensure that food is not contaminated by breakages.

8.10 Storage

Where necessary, adequate facilities for the storage of food, ingredients and non-food chemicals (e.g. cleaning materials, lubricants, fuels) should be provided.

Where appropriate, food storage facilities should be designed and constructed to:

- permit adequate maintenance and cleaning;
- avoid pest access and harbourage;
- enable food to be effectively protected from contamination during storage; and
- where necessary, provide an environment which minimizes the deterioration of food (e.g. by temperature and humidity control).

The type of storage facilities required will depend on the nature of the food. Where necessary, separate, secure storage facilities for cleaning materials and hazardous substances should be provided.

9 Hygienic operating requirements

9.1 Introduction

Food can be contaminated by dirty plant and equipment and by an unhygienic environment. To prevent this risk, cleaning is required. Wet cleaning can be achieved by the removal of soil followed by commercial sterilisation or alternatively by using a detergent steriliser solution. If steam or hot water is used for commercial sterilisation great care must be exercised, as their use can cause condensation on overhead structures, leading to re-contamination of cleaned surfaces. It must be noted that wet surfaces can afford ideal conditions for microbial growth.

Care must be taken with dry cleaning to ensure that dust particles are not released into the plant environment as these carry micro-organisms. For vacuum cleaners this may mean efficient separation of the air.

It is the responsibility of the manufacturer to identify, document, establish and monitor an appropriate cleaning programme for all food contact surfaces and for the environment in which the food is manufactured.

9.2 General requirement

No operation or condition that could be detrimental to the manufacture, processing, treatment or storage of the product shall be permitted in the factory or in its grounds. The factory and its grounds shall convey an orderly, neat and hygienic image. Uncooked meat or meat products shall, in the course of handling, processing and storage, not be unnecessarily exposed to conditions that affect them adversely. Care shall be taken to ensure that there is no contact between raw materials and finished products. Uncleaned and unprepared vegetables shall not be prepared or stored in areas where unprotected meat is handled or stored. Raw food shall not be handled or stored in areas where cooked food is handled or stored. Effective measures shall be taken to inhibit mould growth and to prevent dust, dirt, flaking paint, and other loose or extraneous material from being present in the processing areas or in the storage, freezer storage and refrigeration rooms.

Smoke from factory chimneys or from smoke rooms shall not be allowed to enter the factory building in a quantity or way that is offensive, injurious or dangerous to health or that can contaminate the product at any stage during processing. Vehicles that emit exhaust fumes shall not be used in any area where the unprotected product is exposed.

9.3 Specific requirements

a) There shall be an established, documented, cleaning procedure for cleaning, all food contact surfaces including plant and equipment, walls, floors, windows, gullies and ancillary structures. The cleaning programme shall include dry cleaning, wet cleaning, commercial sterilisation and sterilisation as appropriate. This programme shall also include cleaning at a high level and the cleaning of overhead surfaces.

b) There shall be a cleaning programme for each room, group of rooms or each production area and for the exterior of the plant and outside structures. This programme shall state the frequency with which each item (or groups of items) of equipment is cleaned, the contact time and temperature and strength of cleaning solutions. It shall also state the method and frequency of cleaning of walls, floors, windows, drains, etc. Record of cleaning shall be maintained and there shall be evidence that the cleaning programme has been adhered to.

c) A documented procedure shall also be in place to check the efficiency of cleaning, by microbiological analysis of rinse water, swabbing of surfaces, or other appropriate means.

d) Plant and equipment shall be cleaned at least daily, or more often if required, to control the level of soil or the bacteriological load in the food. This shall not apply in food processes where it can be demonstrated that daily cleaning is not required. It shall be the responsibility of the manufacturer to establish a procedure to monitor that all cleaning has been carried out at the appropriate defined intervals.

e) Sufficient tanks, suitable for the immersion of loose pieces of equipment, shall be available for cleaning purposes. Where these are used during the production cycle for washing, they shall be located in an area separated from the production area or the tanks shall be totally enclosed and designed so there is no risk of contamination of the food by detergents. The tanks shall be fitted with an outlet pipe to facilitate draining.

f) Detergents and sterilising materials shall be stored in a separate area to food and shall be clearly labelled or marked.

g) As most detergents and sterilising materials are hazardous, personnel handling these materials shall be made aware of the danger and the appropriate treatment in the event of accidents. Where required to ensure safety, safety goggles or face shields and gloves shall be available and used when handling hazardous detergents and sterilising materials.

h) Where hazardous materials are being mixed or dispensed an eye washing and shower facility shall be located close to the point of mixing or dispensing.

i) All brooms and hand brushes used to clean in the production area shall be made of material other than wood, shall have nylon bristles, ideally coloured to enable detection of detached bristles, shall be maintained clean and in good condition and when not in use shall be hung up with bristles facing downwards, to aid drying. Brushes used for floors shall not be used on equipment surfaces.

j) Care shall be taken in using cleaning cloths and scouring pads to ensure that they are not a source of contamination i.e. being themselves contaminated or being a source of foreign materials in the food.

k) Equipment such as sampling utensils, manual agitators, shall be cleaned before or after use, as appropriate

l) Plant which operates under dry conditions shall be physically isolated from those parts of the plant which are wet cleaned during the cleaning process.

m) Equipment that has been wet cleaned shall not be used until the equipment is dry where dampness could contaminate the product, for example, powder conveying lines.

n) Where hot solutions are used for cleaning plant or equipment, there shall be adequate and suitable venting to prevent, in as far as possible, condensation on overhead structures.

o) Vacuum cleaners shall be emptied outside the processing areas.

9.4 Recommendations

a) In deciding on a cleaning programme the risk of contamination of the food shall be taken into account. The rate of microbial growth depends on the nature of the food, pH, temperature and water activity.

NOTE Under ideal conditions the number of micro-organisms in food can double every 20 minutes which means that one micro-organism can produce over 2 million micro-organisms in 7 hours.

b) Special attention should be paid in establishing a cleaning programme for powder conveying lines where the powder in hydroscopic, as build-up of damp contaminated powder can occur which may only occasionally contaminate the product. This can be difficult to detect.

c) Vacuum cleaners, or dust extraction units, can also be a source of contamination and it is recommended that the contents are regularly analysed microbiologically. These analyses can be used to help monitor the level of pathogens in the environment of the factory. The use of centralised vacuum systems is not recommended as the pipework can be a potential source of contamination.

d) If high pressure hoses are required in a cleaning programme these should be used at the start of the cleaning programme, as they can have the effect of aerosolising micro-organisms. Recommended safe pressure range is 28 - 49 kg/cm^2 although some hygienists accept 70 kg/cm^2 as an upper limit.

e) After cleaning, food contact surfaces should have a TVC of less than one colony per square centimetre.

f) Levels of chemical sanitisers that have been found to be effective for listeria are chlorine based 100 ppm, iodine 25 ppm, anionics 200 ppm and quaternatry ammonia 100 ppm. These may have to be adjusted, in plant, to compensate for reduction factors such as dilution and oxidation. Other agencies specify a concentration of 200 ppm of chlorine in chemical sanitiser and a contact time of 2 minutes.

g) Brushes used on equipment should be readily identifiable from brushes used on floors. Different coloured bristles could be considered. As listeria tends to be carried into factories by footwear, brushes are a vector for transferring it onto the plant, if the brushes are not properly controlled.

h) Sampling utensils and manual agitators should be stored in a suitable sterilant solution. A chlorous solution is not suitable for aluminium and certain grades of stainless steel, as it causes piting.

9.5 Cleaning and disinfecting

9.5.1 Cleaning equipment, utensils and materials

An adequate supply of cleaning and disinfecting materials, saturated steam, hot and cold running water (that complies with the requirements of 8.1.1), hosepipes, spray nozzles, brushes, scrapers and other equipment necessary for the proper cleaning of the plant, equipment and utensils shall be available. Wire, steel wool or metal scouring wool shall not be used for cleaning surfaces that come into contact with the product. Steam used in direct contact with the product and with product-contact surfaces shall not contain any substances that could be hazardous to health or that could contaminate the product (see 8.1.3). Cleaning and disinfecting materials and equipment shall not be stored in a room where food-handling equipment is stored and shall at no time come into contact with raw materials, the products or their containers or packages. Cleaning equipment, utensils and materials used in a particular area shall be identified. Cleaning equipment, utensils and materials used in areas other than areas where food for human consumption is handled, such as toilets and ablution facilities or by-product plants, shall not be used in areas where food for human consumption is processed.

9.5.2 Physical facilities

The factory and grounds shall be maintained in a clean and hygienic state.

All plant, equipment and utensils shall be maintained in a state of good repair and shall be kept clean. The entire manufacturing and processing or treatment system, including utensils, shall be cleaned at each change of operations. At the end of operations, the entire system shall be both cleaned and disinfected. Immediately before the start of manufacturing operations, plant and utensils shall be rinsed with potable water that complies with the requirements of 8.1.1 and, if necessary, a detergent or disinfectant shall be used.

Adequate precautions shall be taken to prevent the product from being contaminated during the cleaning or disinfection of the processing areas and equipment. Detergents and disinfectants used shall be suitable for the purposes intended.

9.5.3 Floors and drainage channels

During production periods, the floor and the drainage channels shall be kept clean. Thorough cleaning of floors and drainage channels shall take place at the end of each day's operations and as often as is necessary during the working day to maintain hygienic conditions.

The product shall be protected from being splashed with water during the cleaning, rinsing, sweeping and flushing of the floors and equipment.

9.5.4 Walls

The inside surfaces of walls shall be thoroughly washed immediately after each day's operations and as often as is necessary during the working day to maintain hygienic conditions.

9.5.5 Preparation and processing systems

The product shall be prepared, packaged and processed under strictly hygienic conditions. Equipment used for preparation, filling and closing shall be properly cleaned to prevent soiling and contamination of the product. Saws, deboning knives, steels, and cutting boards shall be of hygienic design, and shall, after use, be immediately cleaned, disinfected and stored in a hygienic way.

Saws, knives and other utensils kept in disinfectant solution shall be thoroughly rinsed with potable water before being re-used. The hot water disinfectors shall be kept in a clean, hygienic condition.

When the factory is in operation, equipment and utensils shall not be removed from the work area, except for repair, cleaning or replacement.

9.5.6 Removal of refuse and disposal of effluent and waste

Litter, waste and overflow shall not be allowed to accumulate or give rise to unhygienic conditions and shall be removed promptly from the processing area and disposed of in an efficient and sanitary way. Containers of waste that are awaiting removal from the factory premises shall be physically separated from the processing areas. A separate refuse room or other refuse facility shall be provided on the premises and shall be cleaned and disinfected at least once a day. Establishments shall have an efficient effluent and waste disposal system that shall, at all times, be maintained in good order and repair. All effluent lines (including sewer systems) shall be large enough to carry peak loads and shall be so constructed as to avoid contamination of potable water supplies or the environment. Hazardous substances shall be disposed of in an environmentally acceptable way.

9.5.7 Vermin control

All buildings in which raw materials, packaging materials, and ingredients are stored or in which the product is manufactured or stored shall be kept free from rodents and shall be rodentproof. Potential breeding sites for vermin shall be eliminated. All rooms in which ingredients or raw materials are stored shall in addition be rodentproof.

9.5.8 The use of pesticides

Pesticides shall not be used while processing is in operation. Before pesticides are applied, precautionary measures shall be taken to prevent contamination of the product. Work surfaces shall be kept free from pesticide residues. Pesticides shall at no time come into contact with containers, raw materials or the product or with product-contact surfaces.

Pesticides shall only be handled by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Containers with pesticide bait or open bait shall not be present in any area or room where the exposed product or ingredients are present or are handled.

9.5.9 Animals

Animals, including birds, shall not be allowed in any part of the factory.

10 Personnel hygiene

Objectives:

To ensure that those who come directly or indirectly into contact with food are not likely to contaminate food by:

- maintaining an appropriate degree of personal cleanliness;
- behaving and operating in an appropriate manner.

Rationale:

People who do not maintain an appropriate degree of personal cleanliness, who have certain illnesses or conditions or who behave inappropriately, can contaminate food and transmit illness to consumers.

10.1 Introduction

People are a potential source of disease producing micro-organisms, as these micro-organisms live in certain parts of the body; mainly the hair, nose, mouth, throat, bowel and in sores. They can easily be transferred to the hands as hands are in contact with all parts of the body during the course of the day. Even blowing of the nose into a handkerchief can lead to contamination of hands.

Prevention of contamination of food by personnel depends on everyone being aware of the potential risks associated with bad hygiene practices and behaving in a manner that will prevent these risks. Management has the specific responsibility for developing a good hygiene ethos in the workforce which can only be achieved by example, the provision of good personnel facilities and constant vigilance.

To ensure the safety of food, therefore, it is necessary that employees, including temporary employees, are medically examined and certified as fit to work in a food company, are adequately trained in hygiene and hygiene practices and wear clean suitable protective clothing. These requirements relate to all employees, particularly those entering the production area and includes, management staff, engineers, in addition to production workers. Visitors and contractors must be required to wear suitable protective clothing when entering production areas, and must be effectively managed, to prevent them from being a source of contamination of the food.

It is now generally accepted that medical screening and stool testing are not reliable as procedures to identify all potential carriers of pathogenic micro-organisms. Hence all food handlers must be regarded as a potential source of micro-organisms, and must be adequately trained in good hygiene practices.

10.2 General requirements

10.2.1 Requirements for personal hygiene and behaviours proportional to the hazard posed to the process area or product shall be established and documented. All personnel, visitors and contractors shall be required to comply with the documented requirements.

Management shall ensure that all staff, are medically fit, are adequately trained in good hygiene practices, behave in such a manner as not to contaminate the food, and wear clean protective clothing when entering or working in the production area. Adequate personnel facilities shall be provided.

People known, or suspected, to be suffering from, or to be a carrier of a disease or illness likely to be transmitted through food, should not be allowed to enter any food handling area if there is a likelihood of their contaminating food. Any person so affected should immediately report illness or symptoms of illness to the management.

Medical examination of a food handler should be carried out if clinically or epidemiologically indicated.

10.3 Health status

10.3.1 Before being engaged, employees shall pass an appropriate medical examination to ensure that they are free from communicable diseases, and thereafter they shall pass an annual medical examination. In the case of any absence owing to illness for more than one day, the employee shall, before resuming duty, report the nature of the illness to the factory hygiene officer who shall, should he deem it necessary, take the appropriate steps to obtain a medical opinion on the employee's fitness for work. An appropriate medical record of each employee shall be kept.

10.3.2 Any medical certificate submitted by a factory employee shall be available for inspection.

10.3.3 No employee who is a carrier of, or is suffering from, any communicable disease, especially a carrier of *Salmonella* or *Shigella* organisms, or one who shows symptoms of, or is suffering from, gastro-enteritis or an enterobacterial infection or a disorder or condition that causes discharge of fluid from any part of the skin or body, shall be allowed to come into contact with the product. Any such employee shall immediately report to the factory management.

10.3.4 No employee who is known to be affected with a disease that is capable of being transmitted through food shall be permitted to work in any part of the factory in a capacity in which there is a likelihood of the employee's contaminating the product with pathogenic organisms.

10.3.5 No employee who is suffering from any cut or injury shall be allowed to come into contact with the product unless the cut or injury has been so treated or dressed that the discharge of body fluid has been prevented, and the wound and its dressing have been so covered as to ensure that infection of the employee and contamination of the product are no longer possible. Any lost dressing shall be reported to supervision immediately.

NOTE Dressings should be brightly coloured and metal detectable where appropriate.

10.3.6 Conditions which should be reported to management so that any need for medical examination and/or possible exclusion from food handling can be considered, include:

- jaundice;
- diarrhoea;
- vomiting;
- fever;
- sore throat with fever;
- visibly infected skin lesions (boils, cuts, etc.);
- discharges from the ear, eye or nose.

10.3.7 Food handlers shall maintain a high degree of personal cleanliness and, where appropriate, wear suitable protective clothing, head covering, and footwear. Cuts and wounds, where personnel are permitted to continue working, should be covered by suitable waterproof dressings.

Personnel shall always wash their hands when personal cleanliness may affect food safety, for example:

- at the start of food handling activities;
- immediately after using the toilet or blowing the nose; and
- after handling raw food or any contaminated material, where this could result in contamination of other food items; they should avoid handling ready-to-eat food, where appropriate.

10.3.8 A documented policy shall describe the behaviours required of personnel in processing, packing and storage areas. The policy shall at a minimum cover:

a) permissibility of smoking, eating, chewing in designated areas only;

b) control measures to minimize hazards presented by permitted jewellery;

NOTE Permitted jewellery includes specific types of jewellery which may be worn by the personnel in processing and storage areas, taking into account religious, ethnic, medical and cultural imperatives.

c) permissibility of personal items, such as smoking materials and medicines, in designated areas only;

d) prohibition of the use of nail polish, false nails and false eyelashes;

e) prohibition of carrying of writing implements behind the ears;

f) maintenance of personal lockers so that they are kept free from rubbish and soiled clothing;

g) prohibition of storage of product contact tools and equipment in personal lockers.

10.4 Training

a) All staff including management staff shall be given appropriate induction and ongoing training in hygiene. This training shall be carried out by personnel who are competent in this field.

b) Training records shall be kept.

10.5 Work wear and protective clothing

10.5.1 All employees that are engaged in the handling, preparation and processing of the product up to and including the packaging stage (but excluding employees that operate within freezer storage rooms and chill rooms), shall wear clean, light-coloured, protective clothing, waterproof aprons, waterproof slipovers or boots, and clean, washable or disposable headgear that completely covers their hair. Woollen caps and thermal protective clothing (where applicable) may be worn in freezer storage rooms only. Overalls shall completely cover the personal clothing of the employees.

10.5.2 Sleeves shall not extend below the elbows, except when covered by plastics sleevelets or when worn in freezer storage rooms and chill rooms. Waterproof protective clothing shall be of a plastics or rubber material or a similar acceptable material. All protective clothing shall be of hygienic design, shall have no external pockets, shall be in good repair and shall not constitute a source of contamination to the product.

10.5.3 Protective clothing, other than waterproof aprons, sleevelets and gloves, shall not be stored in work areas; when not in use, it shall be kept in changerooms and shall not be removed from the premises except for laundering under hygienic conditions. The homes of employees shall not be regarded as acceptable for this purpose.

10.5.4 Waterproof aprons, sleevelets and gloves shall be cleaned at each time of removal and as frequently as necessary, and shall be hung on hooks or pegs at exits from production areas during intervals between work and during visits to the toilet. Gloves shall be thoroughly cleaned and then disinfected by the use of chlorinated water or other acceptable solution or procedure. Waterproof aprons, sleevelets and gloves, and also all equipment used in the preparation, processing and packaging of the product, shall not be removed from the work areas except for repairs and for cleaning under hygienic conditions.

10.5.5 Particular attention shall be paid to maintenance staff and contractors to ensure that they do not carry dirt on the clothing into production areas, particularly where product is sensitive to contamination.

10.5.6 Personal garments shall not be worn over protective clothing.

10.5.7 Clean overalls and coats, and covering to cover all hair including beards, shall be worn by all personnel entering or working in the production area. Coats or overalls shall be fitted with no external pockets above the waistline, to prevent the contents from entering the product, and shall be securely fastened; studs or 'velcro' should ideally be used for this purpose.

10.5.8 Footwear shall be clean and workers shall have separate footwear for use in the factory, to protect against the introduction of pathogenic micro-organisms into the food such as salmonella and listeria. Shoes for use in processing areas shall be fully enclosed and made from non absorbent materials.

10.5.9 Protective clothing shall be maintained in a clean condition, shall not be used outside the factory or factory grounds or worn to or from work, as protective clothing is required to protect the food from the individual.

10.5.10 Where gloves are used for product contact, they shall be clean and in good condition.

NOTE Use of latex gloves should be avoided where possible.

Personal protective equipment, where required, shall be designed to prevent product contamination and maintained in hygienic condition.

10.6 Miscellaneous

a) No jewellery, except plain wedding rings and sleeper earrings/studs shall be worn. This includes watches, bangles, etc., as these can be a source of mould and foreign bodies including glass.

b) Personnel working in a food factory shall maintain a high level of personal hygiene, which shall include maintaining clean hands and nails, nails short and free of nail varnish, not using excessive perfume and not indulging in unhygienic practices. Hand and nails shall be washed before commencing or recommencing work and after using the toilet.

c) Smoking shall only be permitted in clearly designated areas which shall not include production areas or toilets. Chewing gum, eating sweets or food shall be prohibited in production areas and food shall not be brought into the production area.

10.7 Personnel hygiene facilities and toilets

Personnel hygiene facilities shall be available to ensure that the degree of personal hygiene required by the organization can be maintained. The facilities shall be located close to the points where hygiene requirements apply and shall be clearly designated.

Establishments shall:

a) provide adequate numbers, locations and means of hygienically washing, drying and, where required, sanitizing hands (including wash basins, supply of hot and cold or temperature controlled water, and soap and/or sanitizer);

b) have sinks designated for hand washing, separate from sinks for food use and equipment cleaning stations. The taps shall be either, foot, knee or electronically operated to prevent re-contamination of hands after washing.

NOTE Taps at hand wash stations should not be hand operated.

c) provide an adequate number of toilets of appropriate hygienic design, each with hand washing, drying and, where required, sanitizing facilities. The toilets shall not lead directly into the processing area and there shall be at least a lobby between the processing area and the toilet.

d) have toilet facilities and external lobby separately ventilated to the external air in such a way as not to contaminate the factory air. The doors to the toilet and the lobby shall be self-closing.

e) have personnel facilities kept in good condition and maintained clean and free from odours so as to create the correct hygiene ethos amongst all personnel working in the factory. This requirement is also necessary to prevent the establishment of sites for the harbourage or breeding of insects, rodents or birds.

f) have employee hygiene facilities that do not open directly onto production, packing or storage areas;

g) have adequate changing facilities for personnel;

h) have paper towels with easily cleanable waste receptacles for used towels, cabinet roller towels, or provide air hand driers adjacent to all wash hand basins (hand washing troughs or fountains) o dry hands. However air hand driers shall not be used in sensitive production areas, to avoid the possible spread of aerosolised bacteria;

i) have changing facilities sited to enable food handling personnel to move to the production area in such a way that risk to the cleanliness of their work wear is minimized.

10.8 Staff canteens and designated eating areas

Staff canteens and designated areas for food storage and consumption shall be situated so that the potential for cross contamination of production areas is minimized.

Staff canteens shall be managed to ensure hygienic storage of ingredients and preparation, storage and serving of prepared foods. Storage conditions and storage, cooking and holding temperatures, and time limitations, shall be specified.

Employees' own food shall be stored and consumed in designated areas only.

10.8 Recommendations

a) The doors leading into the lobby and into toilets should be fitted with a push plate on the outside and a handle on the inside.

b) The lobby of the toilets should be adequate to enable personnel using the toilets to hang up their protective clothing prior to entering the toilet. This is to prevent the possible contamination of the protective clothing.

c) Lockers should ideally have sloped tops or they should be built into walls, to aid cleaning.

d) There should be segregated areas for clean and soiled protective clothing.

e) Precautions should be taken to ensure that clothing does not remain damp in lockers or that stale food is not left in lockers as this can lead to the growth of mould.

f) Clocks should be located throughout the factory.

g) Lockers should, with the agreement of the employees be inspected every three months to ensure that they are maintained in a clean condition and to ensure that they are not a site for the harbourage of insects and rodents.

h) A room with adequate first aid facilities should be provided.

i) Wash hand basins should be located close to work stations and/or close to personnel entrances to the processing area. The recommended number of wash hand basins required is 1 per 15 people in clean processing areas and 1 in 10 people in dirty processing areas.

j) Showers should be provided but of little use if not used. Hence the shower area should be heated, if appropriate, and should have provision for personnel to undress in private.

10.9 Personal hygiene

10.9.1 Before starting work, after each absence from the factory production area, at regular intervals during production, and at any time when necessary, employees shall wash their hands with warm water and acceptable unscented liquid soap or detergent and rinse them in clean, running water. They may then dip their hands in an acceptable disinfectant solution, after which they shall rinse their hands in clean running water, if so required by the usage directions of the hand dip. Neither varnish nor lacquer shall be used on fingernails, and fingernails shall be kept short and clean. Jewellery shall not be worn by employees who handle raw material and the unprotected product.

10.9.2 Neither employees' personal effects nor their food shall be present in any area where the product and its ingredients and packaging materials are handled and stored. Containers used in the preparation, processing or packaging of the product shall not be used for any other purpose.

10.9.3 The use of chewing gum and the use of tobacco in any form shall not be permitted within areas where the product and its ingredients and packaging materials are handled or stored. Spitting shall not be allowed anywhere within the factory premises. Notices to this effect shall be posted strategically.

10.9.4 Visitors

Any person, including employees, who visit or enter the production areas of the factory during the hours of operation, shall, when in those areas, comply with all hygiene requirements and shall wear clean protective clothing that shall be provided by the factory and adhere to the other personal hygiene provisions in this standard.

11 Control of operation

Objective:

To produce food which is safe and suitable for human consumption by:

- formulating design requirements with respect to raw materials, composition, processing, distribution, and consumer use to be met in the manufacture and handling of specific food items; and

- designing, implementing, monitoring and reviewing effective control systems.

Rationale:
To reduce the risk of unsafe food by taking preventive measures to assure the safety and suitability of food at an appropriate stage in the operation by controlling food hazards.

11.1 Control of food hazards

Food business operators should control food hazards through the use of systems such as HACCP. They should:

- **identify** any steps in their operations which are critical to the safety of food;

- **implement** effective control procedures at those steps;

- **monitor** control procedures to ensure their continuing effectiveness; and

- **review** control procedures periodically, and whenever the operations change.

These systems should be applied throughout the food chain to control food hygiene throughout the shelf-life of the product through proper product and process design.

Control procedures may be simple, such as checking stock rotation calibrating equipment, or correctly loading refrigerated display units. In some cases a system based on expert advice, and involving documentation, may be appropriate. A model of such a food safety system is described in *Hazard Analysis and Critical Control (HACCP) System and Guidelines for its Application* (Annex A).

11.2 Key aspects of hygiene control systems

11.2.1 Time and temperature control

Inadequate food temperature control is one of the most common causes of foodborne illness or food spoilage. Such controls include time and temperature of cooking, cooling, processing and storage. Systems should be in place to ensure that temperature is controlled effectively where it is critical to the safety and suitability of food.

Temperature control systems should take into account:

- the nature of the food, e.g. its water activity, pH, and likely initial level and types of microorganisms;

- the intended shelf-life of the product;

- the method of packaging and processing; and

- how the product is intended to be used, e.g. further cooking/processing or ready-to-eat.

Such systems should also specify tolerable limits for time and temperature variations.

Temperature recording devices should be checked at regular intervals and tested for accuracy.

11.2.2 Specific process steps

Other steps which contribute to food hygiene may include, for example:

- chilling
- thermal processing
- irradiation
- drying
- chemical preservation
- vacuum or modified atmospheric packaging

11.2.3 Microbiological and other specifications

Management systems described in 11.1 offer an effective way of ensuring the safety and suitability of food. Where microbiological, chemical or physical specifications are used in any food control system, such specifications should be based on sound scientific principles and state, where appropriate, monitoring procedures, analytical methods and action limits.

11.2.4 Microbiological cross-contamination

Pathogens can be transferred from one food to another, either by direct contact or by food handlers, contact surfaces or the air. Raw, unprocessed food should be effectively separated, either physically or by time, from ready-to-eat foods, with effective intermediate cleaning and where appropriate disinfection.

Access to processing areas may need to be restricted or controlled. Where risks are particularly high, access to processing areas should be only via a changing facility. Personnel may need to be required to put on clean protective clothing including footwear and wash their hands before entering.

Surfaces, utensils, equipment, fixtures and fittings should be thoroughly cleaned and where necessary disinfected after raw food, particularly meat and poultry, has been handled or processed.

11.2.5 Physical and chemical contamination

Systems should be in place to prevent contamination of foods by foreign bodies such as glass or metal shards from machinery, dust, harmful fumes and unwanted chemicals. In manufacturing and processing, suitable detection or screening devices should be used where necessary.

11.3 Provisions applicable to foodstuffs

11.3.1 A food business operator shall not accept raw materials or ingredients, other than live animals, or any other material used in processing products, if they are known to be, or might reasonably be expected to be, contaminated with parasites, pathogenic microorganisms or toxic, decomposed or foreign substances to such an extent that, even after the food business operator had hygienically applied normal sorting and/or preparatory or processing procedures, the final product would be unfit for human consumption. Where appropriate, specifications for raw materials should be identified and applied.

11.3.2 Raw materials and all ingredients stored in a food business shall be kept in appropriate conditions designed to prevent harmful deterioration and protect them from contamination. Raw materials or ingredients should, where appropriate, be inspected and sorted before processing. Where necessary, laboratory tests should be made to establish fitness for use. Only sound, suitable raw materials or ingredients should be used.

11.3.3 Stocks of raw materials and ingredients should be subject to effective stock rotation.

11.3.4 At all stages of production, processing and distribution, food shall be protected against any contamination likely to render the food unfit for human consumption, injurious to health or contaminated in such a way that it would be unreasonable to expect it to be consumed in that state.

11.3.5 Adequate procedures shall be in place to control pests. Adequate procedures are also to be in place to prevent domestic animals from having access to places where food is prepared, handled or stored (or, where the competent authority so permits in special cases, to prevent such access from resulting in contamination).

11.3.6 Raw materials, ingredients, intermediate products and finished products likely to support the reproduction of pathogenic micro-organisms or the formation of toxins shall not be kept at temperatures that might result in a risk to health. The cold chain shall not be interrupted. However, limited periods outside temperature control are permitted, to accommodate the practicalities of handling during preparation, transport, storage, display and service of food, provided that it does not result in a risk to health. Food businesses manufacturing, handling and wrapping processed foodstuffs are to have suitable rooms, large enough for the separate storage of raw materials from processed material and sufficient separate refrigerated storage.

11.3.7 Where foodstuffs are to be held or served at chilled temperatures they shall be cooled as quickly as possible following the heat-processing stage, or final preparation stage if no heat process is applied, to a temperature which does not result in a risk to health.

11.3.8 The thawing of foodstuffs shall be undertaken in such a way as to minimize the risk of growth of pathogenic microorganisms or the formation of toxins in the foods. During thawing, foods shall be subjected to temperatures that would not result in a risk to health. Where run-off liquid from the thawing process may present a risk to health it shall be adequately drained. Following thawing, food shall be handled in such a manner as to minimize the risk of growth of pathogenic microorganisms or the formation of toxins.

11.3.9 Hazardous and/or inedible substances, including animal feed, shall be adequately labelled and stored in separate and secure containers.

11.4 Provisions applicable to the wrapping and packaging of foodstuffs

11.4.1 Packaging design and materials shall provide adequate protection for products to minimize contamination, prevent damage, and accommodate proper labelling.

11.4.2 Packaging materials or gases where used shall be non-toxic and not pose a threat to the safety and suitability of food under the specified conditions of storage and use. Where appropriate, reusable packaging should be suitably durable, easy to clean and, where necessary, disinfect.

11.4.3 Wrapping materials shall be stored in such a manner that they are not exposed to a risk of contamination.

11.4.4 Wrapping and packaging operations shall be carried out so as to avoid contamination of the products. Where appropriate and in particular in the case of cans and glass jars, the integrity of the container's construction and its cleanliness is to be assured.

11.5 Water

11.5.1 In contact with food

Only potable water, shall be used in food handling and processing, with the following exceptions:

- for steam production, fire control and other similar purposes not connected with food; and
- in certain food processes, e.g. chilling, and in food handling areas, provided this does not constitute a hazard to the safety and suitability of food (e.g. the use of clean sea water).

Water recirculated for reuse should be treated and maintained in such a condition that no risk to the safety and suitability of food results from its use. The treatment process should be effectively monitored. Recirculated water which has received no further treatment and water recovered from processing of food by evaporation or drying may be used, provided its use does not constitute a risk to the safety and suitability of food.

11.5.2 As an ingredient

Potable water should be used wherever necessary to avoid food contamination.

11.5.3 Ice and steam

Ice shall be made from water that complies with 8.1.1. Ice and steam shall be produced, handled and stored to protect them from contamination.

Steam used in direct contact with food or food contact surfaces shall not constitute a threat to the safety and suitability of food.

11.6 Management of purchased materials

11.6.1 General requirements

Purchasing of materials which impact food safety shall be controlled to ensure that the suppliers used have the capability to meet the specified requirements. The conformance of incoming materials to specified purchase requirements shall be verified.

11.6.2 Selection and management of suppliers

There shall be a defined process for the selection, approval and monitoring of suppliers. The process used shall be justified by hazard assessment, including the potential risk to the final product, and shall include:

a) assessment of the supplier's ability to meet quality and food safety expectations, requirements and specifications;

b) description of how suppliers are assessed;

    NOTE Examples of a description of how suppliers are assessed include:

    a) audit of the supplying site prior to accepting materials for production;

    b) appropriate third party certification.

c) monitoring the performance of the supplier to assure continued approval status.

NOTE Monitoring may include conformance to material or product specifications, meeting COA requirements, satisfactory audit outcomes.

11.6.3 Incoming material requirements (raw/ingredients/packaging)

Delivery vehicles shall be checked prior to, and during, unloading to verify that the quality and safety of the material has been maintained during transit (e.g. seals are intact, free from infestation, temperature records exist).

Materials shall be inspected, tested or covered by COA to verify conformance to specified requirements prior to acceptance or use. The method of verification shall be documented.

NOTE The inspection frequency and scope may be based on the hazard presented by the material and the risk assessment of the specific suppliers.

Materials which do not conform to relevant specifications shall be handled under a documented procedure which ensures they are prevented from unintended use.

Access points to bulk material receiving lines shall be identified, capped and locked. Discharge into such systems shall take place only after approval and verification of the material to be received.

11.7 Measures for prevention of cross contamination

11.7.1 General requirements

Programmes shall be in place to prevent, control and detect contamination. Measures to prevent physical, allergen and microbiological contamination shall be included.

11.7.2 Microbiological cross contamination

Areas where potential for microbiological cross contamination exists (airborne or from traffic patterns) shall be identified and a segregation (zoning) plan implemented. A hazard assessment shall be carried out to determine potential contamination sources, susceptibility of the product and control measures suitable for these areas as follows:

a) separation of raw from finished or ready to eat (RTE) products;

b) structural segregation – physical barriers/walls/separate buildings;

c) access controls with requirements to change into required work wear;

d) traffic patterns or equipment segregation – people, materials, equipment and tools (including use of dedicated tools);

e) air pressure differentials.

11.7.3 Allergen management

Allergens present in the product, either by design or by potential manufacturing cross contact, shall be declared. The declaration shall be on the label for consumer products, and on the label or the accompanying documentation for products intended for further processing.

Products shall be protected from unintended allergen cross contact by cleaning and line change-over practices and/or product sequencing.

NOTE Manufacturing cross contact may arise from either:

a) traces of product from the previous production run which cannot be adequately cleaned from the product line due to technical limitations;

b) when contact is likely to occur, in the normal manufacturing process, with products or ingredients that are produced on separate lines, or in the same or adjacent processing areas.

Rework containing allergen(s) shall be used only:

a) in products which contain the same allergen(s) by design; or

b) through a process which is demonstrated to remove or destroy the allergenic material.

NOTE 1 For general rework requirements see Clause 14.

NOTE 2 Food handling employees should receive specific training in allergen awareness and associated manufacturing practices.

11.7.4 Physical contamination

Where glass and/or brittle material are used, periodic inspection requirements and defined procedures in case of breakage shall be put in place.

NOTE Glass and brittle material (such as hard plastic components in equipment) should be avoided where possible.

Glass breakage records shall be maintained.

Based on hazard assessment, measures shall be put in place to prevent, control or detect potential contamination.

NOTE 1 Examples of such measures include:

a) adequate covers over equipment or containers for exposed materials or products;

b) use of screens, magnets, sieves or filters;

c) use of detection/ rejection devices such as metal detectors or X-ray.

NOTE 2 Sources of potential contamination include wooden pallets and tools, rubber seals, personal protective clothing and equipment, etc.

11.8 Heat treatment

The following requirements apply only to food placed on the market in hermetically sealed containers:

11.8.1 any heat treatment process used to process an unprocessed product or to process further a processed product is:

a) to raise every party of the product treated to a given temperature for a given period of time; and

b) to prevent the product from becoming contaminated during the process;

11.8.2 to ensure that the process employed achieves the desired objectives, food business operators are to check regularly the main relevant parameters (particularly temperature, pressure, sealing and microbiology), including by the use of automatic devices;

11.8.3 the process used should conform to an internationally recognized standard (for example, pasteurization, ultra high temperature or sterilization).

11.9 Management and supervision

The type of control and supervision needed will depend on the size of the business, the nature of its activities and the types of food involved. Managers and supervisors should have enough knowledge of food hygiene principles and practices to be able to judge potential risks, take takes place.

11.10 Documentation records

Where necessary, appropriate records of processing, production and distribution should be kept and retained for a period that exceeds the shelf-life of the product. Documentation can enhance the credibility and effectiveness of the food safety control system.

11.11 Recall procedures

Managers shall ensure effective procedures are in place to deal with any food safety hazard and to enable the complete, rapid recall of any implicated lot of the finished food from the market. Where a product has been withdrawn because of an immediate health hazard, other products which are produced under similar conditions, and which may present a similar hazard to public health, shall be evaluated for safety and may need to be withdrawn. The need for public warnings shall be considered. A list of key contacts in the event of a recall shall be maintained.

Recalled products shall be held under supervision until they are destroyed, used for purposes other than human consumption, determined to be safe for human consumption, or reprocessed in a manner to ensure their safety.

12 Food safety

12.1 Introduction

By far the most frequent cause of food contamination is the presence in food of food spoilage or pathogenic (disease causing) micro-organisms and foreign bodies. The best known pathogenic micro-organisms are species of bacteria, however some moulds, viruses and protozoa are also pathogenic.

It is the responsibility of all food manufacturers to take all reasonable precautions to prevent and control the risk of food contamination in locations or premises directly under their control. The most effective way to do this is to install documented system and procedures for the prevention and control of the risk of food contamination. On their own, inspection and testing of food products is insufficient to assure that food is free from contamination. To assess what is required to assure the safety of food, the HACCP system of evaluation may be used.

HACCP [Hazard Analysis and Critical Control Points] is the intelligent application of the principles of hazard Analysis and the identification of Critical Control Points.

Hazard analysis for a food manufacturer is the rational process of estimating the risks associated with the processing and marketing of a foodstuff. Risks associated with processing include contamination by micro-organisms and foreign bodies. The risk of microbiological contamination of a food is generally greatest after the food has been processed and before it is packaged. When marketing a foodstuff, foods which must be maintained at temperatures other than ambient are most susceptible to abuse during distribution and retailing.

Critical Control Points in food processing operations are the vital key points in the process, that must be controlled to safeguard the health of the consumer. Such points would include pasteurisation, cooking and the exclusion of foreign bodies. The maintenance of the cold chain is also critical to assure the safety of chilled and frozen.

In determining the level of prevention and control that is required to protect the consumer from food borne illness, food including food ingredients may be categorised as follows.

High risk — Foods which are a potential source of pathogenic micro-organisms and are either

— Intended for consumption by the consumer without a cooking step, immediately prior to consumption, which is adequate to kill pathogenic micro-organisms;

— Intended for consumption by people with low immunity, infants, geriatrics and hospital patients;

— Intended for use as an ingredient in the pharmaceutical/medical industry.

Medium risk — Foods which are a potential source of pathogenic micro-organisms and are intended for consumption by the consumer with a cooking step, immediately prior to consumption, which is adequate to kill pathogenic micro-organisms;

or

Foods which do not belong to the other two categories.

Low risk — Foods not previously known to be a source of pathogenic micro-organisms and in which harmful residues or chemicals have rarely been found.

12.2 General requirement

12.2.1 Food shall not be placed on the market if it is unsafe.

12.2.2 Food shall be deemed to be unsafe if it is considered to be:

a) injurious to health;

b) unfit for human consumption.

12.2.3 In determining whether any food is unsafe, regard shall be had:

a) to the normal conditions of use of the food by the consumer and at each stage of production, processing and distribution, and

b) to the information provided to the consumer, including information on the label, or other information generally available to the consumer concerning the avoidance of specific adverse health effects from a particular food or category of foods.

12.2.4 In determining whether any food is injurious to health, regard shall be had:

a) not only to the probable immediate and/or short-term and/or long-term effects of that food on the health of a person consuming it, but also on subsequent generations;

b) to the probable cumulative toxic effects;

c) to the particular health sensitivities of a specific category of consumers where the food is intended for that category of consumers.

12.2.5 In determining whether any food is unfit for human consumption, regard shall be had to whether the food is unacceptable for human consumption according to its intended use, for reasons of contamination, whether by extraneous matter or otherwise, or through putrefaction, deterioration or decay.

12.2.6 Where any food which is unsafe is part of a batch, lot or consignment of food of the same class or description, it shall be presumed that all the food in that batch, lot or consignment is also unsafe, unless following a detailed assessment there is no evidence that the rest of the batch, lot or consignment is unsafe.

12.2.7 Food that complies with specific African Standards governing food safety shall be deemed to be safe insofar as the aspects covered by the specific African Standards are concerned.

12.2.8 Conformity of a food with specific African Standards applicable to that food shall not bar the competent authorities from taking appropriate measures to impose restrictions on it being placed on the market or to require its withdrawal from the market where there are reasons to suspect that, despite such conformity, the food is unsafe.

12.2.9 Where there are no specific African Standards, food shall be deemed to be safe when it conforms to the specific standards of the Partner State in whose territory the food is marketed.

12.2.10 It shall be the responsibility of the manufacturer, to identify and list the chemical, functional, organoleptic and micro-biological tests, the procedures used, and, frequencies that are required to identify, sanitation failures or food contamination. The manufacturer shall establish specifications for raw materials, in process materials and finished product and shall take adequate precautions to ensure that food is free of foreign bodies. Special precautions shall be taken in processing high-risk foods. All contaminated food shall be rejected, or treated or re-processed to eliminate the contamination where this can be achieved.

12.3 Specific requirements — Food safety

a) It shall be the responsibility of the manufacturer to identify, list, and establish appropriate chemical, functional, microbiological and organoleptic specifications for all raw materials (including additives, ingredients and processing aids) and in process materials.

b) It shall be the responsibility of the manufacturer to establish appropriate chemical, functional, microbiological and organoleptic specifications for finished products.

c) It shall be the responsibility of the manufacturer to test, or have tested, raw materials, in process materials and finished product at a frequency commensurate with the risk to the safety of the finished product. These tests shall be carried out in accordance with defined procedures. Supplier guarantees shall be adequate to eliminate or reduce the testing requirement for raw materials.

d) Environmental sampling and microbiological analysis of these samples shall be carried out, at a level commensurate with identifying the risk to the safety of the finished product.

e) It shall be the responsibility of the manufacturer to identify, monitor and record all critical parameters in the process to ensure that the finished product is microbiologically safe. Critical parameters shall include any heat processing required to pasteurise or sterilise the product, hygiene and cleaning procedures, the strength of active ingredients and the temperature for each washing cycle and post heat treatment handling.

NOTE Measuring instruments used to monitor critical parameters shall be calibrated at appropriate intervals; to ensure that the accuracy of the measurements instruments are within defined limits.

f) Records of all processes required to assure the safety of food shall be inspected a least daily by a suitably qualified person. The records shall be signed to show that the inspection has taken place. The purpose of this is to demonstrate that the process has been carried out under the required conditions.

g) In the event that microbiological results are outside the defined microbiological criteria (i.e. Action Limits) for raw materials, in process materials, finished product or the environment, timely action shall be taken to identify and rectify the cause so as to prevent the manufacture of product outside the established microbiological specification.

h) There shall be a written procedure defining what action is to be taken to ensure that finished product, produced during or after failure in the control of a critical parameter, is not released for sale or consumption until it is established that the product is safe. The only permitted exception to this requirement is where the product is sold for further treatment or processing which will eliminate the contamination.

i) Food contaminated by pathogenic organisms shall be rejected, or treated, or processed, to eliminate the contamination where this is possible. It shall not be blended with uncontaminated product, as a means of bringing the food within specification.

j) Packaging material used in contact with food, shall be free of contamination and shall not taint the food.

12.4 Specific requirements — Foreign matter

a) It shall be the responsibility of the manufacturer to take all necessary precautions to ensure that the food is free of foreign matter other than unavoidable defects. Precautions shall include, inspection of raw materials, keeping the production area free from extraneous material and the proper control of birds, rodents or insects.

b) It shall be the responsibility of the manufacturer to establish procedures for maintaining unavoidable defects at a minimum, at all stages of production. The level of these defects in the food shall not present a health hazard.

c) Where glass containers are used for packaging, the manufacturer shall establish suitable handling procedures, to eliminate the possible contamination of the food by glass fragments or splinters.

d) No glass containers, other than glass containers to be used for finished product packaging, shall be brought into the production area. These shall include, ingredients in glass containers, measuring jugs, analytical equipment and glass thermometers other than those encased in metal.

e) Glass pipes, flow meters and glass equipment should be avoided, but if used there shall be a documented procedure for routine inspection for cracks and splinters.

f) Glass windows if broken must be reported immediately to the designated person, whose responsibility it is to identify and have destroyed any food that could possibly have been contaminated by glass. These windows must be replaced as soon as possible but not during production unless adequate screens are installed.

g) A metal detector shall be installed, where appropriate, on all consumer lines, located so as to inspect the finished consumer pack or packs, where this is technically possible. The detector shall be capable of detecting 2 mm spheres of ferrous and 2.5 mm spheres of non-ferrous material unless the composition of the food makes this impossible. The sensitivity of the search head shall be checked at least once per 8-hour shift by a designated person/persons.

NOTE The response time of the detector shall be checked to ensure that the correct package is rejected.

12.5 Specific requirements — High risk foods

a) High risk areas shall be physically separated either by partition location or other effective means from other areas of the factory. High risk processing areas are defined as all areas where high risk foods are exposed if the subsequent processing does not contain a step which effectively destroys all harmful micro-organisms or areas where high risk foods are exposed after they have undergone a processing step which effectively destroys harmful micro-organisms.

b) Access to high risk processing areas shall be restricted to designated personnel, who shall wear readily identifiable protective clothing and footwear.

c) Access to high-risk areas shall be via a changing room only, where personnel entering the area shall change to readily identifiable protective clothing including footwear.

d) The air supply to high-risk areas shall be filtered to 2 microns and the area shall be kept under positive pressure. High-Efficiency Particulate Air (HEPA) filters may be used to filter the air.

e) No toilet facilities, other than wash hand basins, shall be located in high-risk areas.

f) In cases where employees develop chronic pathogen infection, such employees shall not be permitted to have access to high risk processing areas. [Good employers should seek to place such employees in other areas of their business.]

12.6 Recommendation

a) Emphasis should be placed on prevention rather than detection.

b) For each production line a tracking system for microbiological contamination should be established. The reason is to track the location of possible sources of contamination. These sources can be established by environmental sampling and testing of the samples for pathogenic and food spoilage micro-organisms combined with microbiological analysis of the food at various critical stages in the production. For an effective tracking system, an appropriate minimum level of sampling and testing should be established. This level should be increased, as appropriate, if problems are encountered until effective action have been taken to address the problems.

c) Raw materials which could affect the safety of the finished product should only be purchased from approved suppliers. A list of such suppliers should be maintained and their performance record should be monitored.

d) In designing a food plant or replacing glass, it is recommended that transparent PVC or the equivalent be used in those areas where food is exposed or where there is a risk of contamination of food, in the event of the glass being broken.

e) Metal detectors should be fitted with an automatic rejection mechanism which rejects metal containing product into a locked inaccessible container. The reject mechanism, if present, shall be checked when the metal detector is being checked. Where automatic rejection is not feasible, automatic stopping of the line is a suitable alternative.

f) Thermometers containing mercury should not be used or brought into processing areas.

13 Establishment: Maintenance, cleaning and sanitation

Objective:

To establish effective systems to:

- ensure adequate and appropriate maintenance and cleaning;
- control pests;
- manage waste; and
- monitor effectiveness of maintenance and sanitation procedures.

Rationale:

To facilitate the continuing effective control of food hazards, pests, and other agents likely to contaminate food.

13.1 Cleaning and sanitizing

13.1.1 General requirements

Cleaning and sanitizing programmes shall be established to ensure that the food processing equipment and environment are maintained in a hygienic condition. Programmes shall be monitored for continuing suitability and effectiveness.

13.1.2 Establishments and equipment should be kept in an appropriate state of repair and condition to:

- facilitate all sanitation procedures;
- function as intended, particularly at critical steps (see Clause 11.1);
- prevent contamination of food, e.g. from metal shards, flaking plaster, debris and chemicals.

Cleaning should remove food residues and dirt which may be a source of contamination. The necessary cleaning methods and materials will depend on the nature of the food business. Disinfection may be necessary after cleaning.

Cleaning chemicals should be handled and used carefully and in accordance with manufacturers' instructions and stored, where necessary, separated from food, in clearly identified containers to avoid the risk of contaminating food.

13.1.3 Cleaning and sanitizing agents and tools

Facilities and equipment shall be maintained in a condition which facilitates wet or dry cleaning and/or sanitation.

Cleaning and sanitizing agents and chemicals shall be clearly identified, food grade, stored separately and used only in accordance with the manufacturer's instructions.

Tools and equipment shall be of hygienic design and maintained in a condition which does not present a potential source of extraneous matter.

13.1.4 Cleaning procedures and methods

Cleaning can be carried out by the separate or the combined use of physical methods, such as heat, scrubbing, turbulent flow, vacuum cleaning or other methods that avoid the use of water, and chemical methods using detergents, alkalis or acids.

Cleaning procedures will involve, where appropriate:

- removing gross debris from surfaces;
- applying a detergent solution to loosen soil and bacterial film and hold them in solution or suspension;
- rinsing with water which complies with Clause 8.1, to remove loosened soil and residues of detergent;
- dry cleaning or other appropriate methods for removing and collecting residues and debris; and
- where necessary, disinfection with subsequent rinsing unless the manufacturers' instructions indicate on scientific basis that rinsing is not required.

13.2 Cleaning and sanitizing programmes

Cleaning and sanitizing programmes shall be established and validated by the organization to ensure that all parts of the establishment and equipment are cleaned and/or sanitized to a defined schedule, including the cleaning of cleaning equipment.

Cleaning and/or sanitizing programmes shall specify at a minimum:

a) areas, items of equipment and utensils to be cleaned and/or sanitized;

b) responsibility for the tasks specified;

c) cleaning/sanitizing method and frequency;

d) monitoring and verification arrangements;

e) post-clean inspections;

f) pre start-up inspections.

Cleaning in place (CIP) systems shall be separated from active product lines.

Parameters for CIP systems shall be defined and monitored (including type, concentration, contact time and temperature of any chemicals used).

Cleaning and disinfection programmes should be continually and effectively monitored for their suitability and effectiveness and where necessary, documented.

Where appropriate, programmes should be drawn up in consultation with relevant specialist expert advisors.

13.3 Pest control systems

13.3.1 Introduction

Pests pose a major threat to the safety and suitability of food. Pest infestations can occur where there are breeding sites and a supply of food. Hygiene, cleaning, incoming materials inspection and monitoring procedures shall be implemented to avoid creating an environment conducive to pest activity and thereby limit the need for pesticides.

13.3.2 General requirements

Rodents, birds, domestic and other animals, and insects shall be excluded, in as far as is practicably possible, from the factory. The grounds of the factory shall be protected and maintained so as to avoid the establishment of breeding sites for rodents and insects. Domestic and other animals, shall be excluded from the factory ground, other than in the case of abattoirs or slaughter houses where they shall be adequately penned.

13.3.3 Pest control programmes

The establishment shall have a nominated person to manage pest control activities and/or deal with appointed expert contractors.

Pest management programmes shall be documented and shall identify target pests, and address plans, methods, schedules, control procedures and, where necessary, training requirements.

Programmes shall include a list of chemicals which are approved for use in specified areas of the establishment.

13.3.4 Preventing access

Buildings shall be kept in good repair and condition to prevent pest access and to eliminate potential breeding sites. Holes, drains and other places where pests are likely to gain access shall be kept sealed. Wire mesh screens, for example on open windows, doors and ventilators, will reduce the problem of pest entry. Animals shall, wherever possible, be excluded from the grounds of factories and food processing plants.

13.3.5 Harbourage and infestation

Storage practices shall be designed to minimize the availability of food and water to pests. Potential food sources should be stored in pest-proof containers and/or stacked above the ground and away from walls.

Material found to be infested shall be handled in such a way as to prevent contamination of other materials, products or the establishment.

Potential pest harbourage (e.g. burrows, undergrowth, stored items) shall be removed.

Where outside space is used for storage, stored items shall be protected from weather or pest damage (e.g. bird droppings).

Areas both inside and outside food premises should be kept clean. Where appropriate, refuse should be stored in covered, pest-proof containers.

13.3.6 Monitoring and detection

Pest monitoring programmes shall include the placing of detectors and traps in key locations to identify pest activity. A map of detectors and traps shall be maintained. Detectors and traps shall be designed and located so as to prevent potential contamination of materials, products or facilities.

Detectors and traps shall be of robust, tamper resistant construction. They shall be appropriate for the target pest.

The detectors and traps shall be inspected at a frequency intended to identify new pest activity. The results of inspections shall be analysed to identify trends.

13.3.7 Eradication

Eradication measures shall be put in place immediately after evidence of infestation is reported and without adversely affecting food safety or suitability. Treatment with chemical, physical or biological agents should be carried out without posing a threat to the safety or suitability of food.

Pesticide use and application shall be restricted to trained operatives and shall be controlled to avoid product safety hazards.

Records of pesticide use shall be maintained to show the type, quantity and concentrations used; where, when and how applied, and the target pest.

13.3.8 Specific requirements

a) Fixed plant and equipment on floors shall be either 0.3 metres from the ground and 0.5 metres from walls, or shall be adequately sealed to prevent the build-up of dirt behind or under the equipment.

b) Air intake points and opening windows shall be a least fitted with a fly screen. (Mesh size No. 16 - 1.2 mm gap.)

c) Insect electrocuters shall be placed in all processing areas, where food is exposed. Ideally they shall be located not more than 2.4 metres from the floor, in an area free from droughts and not over areas where food could be exposed. They shall be placed away from natural light and shall be fitted with a catch tray, which shall be cleaned at defined appropriate intervals. This shall not apply if there is a sound technical reason for not having insect electrocuters such as a fire risk or a risk of a dust explosion.

d) UV tubes on insect electrocuters shall be replaced at least every year and they shall be left on permanently, except when the plant is closed for a period in excess of 7 days. Records shall be kept of these replacements.

e) External doors shall be rodent proof (i.e. gaps not exceeding 6 mm) and shall be fitted with self-closers or protected by an internal lobby with a self-closing door. Plastic or air curtains may be used as an alternative to secondary doors.

f) The factory shall be inspected at least every three months, for evidence of infestation by insects or rodents, and for the presence of birds, or wild or domestic animals. The inspection shall be carried out by trained personnel.

g) Raw materials deliveries shall be inspected where appropriate for the presence of infestation in accordance with defined written procedures.

h) If evidence of infestation is found in or around the factory premises, action shall be taken to remove or control the infestation.

i) Insecticides and rodenticides if used, shall be used under such precautions and restrictions as to prevent the contamination of food or packing materials with illegal residues. Insecticides and rodenticides which look similar to the food being manufactured, or are in similar containers to those used for packaging, shall not be used.

j) Birds shall be excluded from all production and storage areas and adequate steps must be taken to ensure that this is effective; subject to the legal requirements for the preservation of wild life.

k) A site drawing and register of all baiting points shall be kept up-to-date and open baits shall not be used in processing areas.

13.3.8 Recommendations

a) To rodent proof door, bristle strips can be used.

b) Inspections are recommended at intervals of six weeks.

c) Fly screens should be made of stainless steel or nylon.

13.4 Waste management

13.4.1 General requirements

Systems shall be in place to ensure that waste materials are identified, collected, removed and disposed of in a manner which prevents contamination of products or production areas.

Waste stores must be kept appropriately clean.

13.4.2 Containers for waste and inedible or hazardous substances

Containers for waste and inedible or hazardous substances shall be:

a) clearly identified for their intended purpose;

b) located in a designated area;

c) constructed of impervious material which can be readily cleaned and sanitized;

d) closed when not in immediate use;

e) locked where the waste may pose a risk to the product.

13.4.3 Waste management and removal

Provision shall be made for the segregation, storage and removal of waste.

Accumulation of waste shall not be allowed in food handling or storage areas. Removal frequencies shall be managed to avoid accumulations, with a minimum daily removal.

Labelled materials, products or printed packaging designated as waste shall be disfigured or destroyed to ensure that trademarks cannot be reused. Removal and destruction shall be carried out by approved disposal contractors. The organization shall retain records of destruction.

13.4.4 Drains and drainage

Drains shall be designed, constructed and located so that the risk of contamination of materials or products is avoided. Drains shall have capacity sufficient to remove expected flow loads. Drains shall not pass over processing lines.

Drainage direction shall not flow from a contaminated area to a clean area.

13.5 Monitoring effectiveness

Sanitation systems should be monitored for effectiveness, periodically verified by means such as audit pre-operational inspections or, where appropriate, microbiological sampling of environment and food contact surfaces and regularly reviewed and adapted to reflect changed circumstances.

14 Rework

14.1 General requirements

Rework shall be stored, handled and used in such a way that product safety, quality, traceability and regulatory compliance are maintained.

14.2 Storage, identification and traceability

Stored rework shall be protected from exposure to microbiological, chemical or extraneous matter contamination.

Segregation requirements for rework (e.g. allergen) shall be documented and met.

Rework shall be clearly identified and/or labelled to allow traceability. Traceability records for rework shall be maintained.

The rework classification or the reason for rework designation shall be recorded (e.g. product name, production date, shift, line of origin, shelf life).

14.3 Rework usage

Where rework is incorporated into a product as an ”in-process” step, the acceptable quantity, type and conditions of rework use shall be specified. The process step and method of addition, including any necessary pre-processing stages, shall be defined.

Where rework activities involve removing a product from filled or wrapped packages, controls shall be put in place to ensure the removal and segregation of packaging materials and to avoid contamination of the product with extraneous matter.

15 Transportation, storage and distribution

Objectives:

Measures should be taken where necessary to:

- protect food from potential sources of contamination;
- protect food from damage likely to render the food unsuitable for consumption; and
- provide an environment which effectively controls the growth of pathogenic or spoilage micro-organisms and the production of toxins in food.

Rationale:

Food may become contaminated, or may not reach its destination in a suitable condition for consumption, unless effective control measures are taken during transport, even where adequate hygiene control measures have been taken earlier in the food chain.

15.1 Introduction

Storage, distribution and transport must be such as to prevent damage, contamination or deterioration of the food or materials which come into contact with the food.

Food must be adequately protected during transport. The type of conveyances or containers required depends on the nature of the food and the conditions under which it has to be transported.

Vehicles used for the transport or distribution of food shall be, easy to clean, clean, free from odours and weatherproof, and in the case of vehicles with refrigeration, the refrigeration unit shall be adequate, to maintain the food at the required temperature.

15.2 Transport and distribution

a) All vehicles used for the transport of food shall be inspected before loading, to ensure that they are clean and weatherproof. Where appropriate, the refrigeration unit shall be inspected, to ensure that it is in working condition and that there is adequate fuel in the units fuel tank.

b) The internal surfaces of the vehicle body shall be impervious and easy to clean and the vehicle body shall be sealed, to prevent the entry of pests, exhaust fumes and other sources of contamination.

c) In the case of an insulated, container or vehicle body, the outside cladding shall be weatherproof, so as to prevent loss of the insulation properties due to moisture entering the insulation.

d) Care shall be taken when loading food into refrigerated transport to ensure that there is adequate air circulation around the food and that the food on loading is at the correct temperature, as refrigeration units on transport vehicles have not the capacity to cool product.

e) Food shall not be transported in the same container or unit as non-food items unless it can be demonstrated the non-food items present no risk of contaminating the food.

f) Tankers and bulk units used for the transport of food, where the food comes into direct contact with the internal surfaces, shall be cleaned at appropriate intervals. These tankers and bulk unit shall not be used for the transportation of non-food items, unless it can be demonstrated that such items do not present a potential hazard to the food.

g) CIP (Cleaning in Place) washing units or washing units which contain a re-circulation system for washing food tankers or bulk units shall not be used to wash tankers or bulk units which contained non-food products.

h) Loading or unloading of food or materials which will come into contact with food shall not take place under conditions which could cause deterioration, contamination or damage.

i) Where necessary, conveyances and bulk containers should be designed and constructed so that they:

- do not contaminate foods or packaging;
- can be effectively cleaned and, where necessary, disinfected;
- permit effective separation of different foods or foods from non-food items where necessary during transport;
- provide effective protection from contamination, including dust and fumes;
- can effectively maintain the temperature, humidity, atmosphere and other conditions necessary to protect food from harmful or undesirable microbial growth and deterioration likely to render it unsuitable for consumption; and
- allow any necessary temperature, humidity and other conditions to be checked.

j) Conveyances and/or containers used for transporting foodstuffs are to be kept clean and maintained in good repair and condition to protect foodstuffs from contamination and are, where necessary, to be designed and constructed to permit adequate cleaning and/or disinfection. Where the same conveyance or container is used for transporting different foods, or non-foods, effective cleaning and, where necessary, disinfection should take place between loads.

k) Where appropriate, particularly in bulk transport, containers and conveyances should be designated and marked for food use only and be used only for that purpose.

l) Receptacles in vehicles and/or containers are not to be used for transporting anything other than foodstuffs where this may result in contamination.

m) Where conveyances and/or containers are used for transporting anything in addition to foodstuffs or for transporting different foodstuffs at the same time, there is, where necessary, to be effective separation of products.

n) Bulk foodstuffs in liquid, granulate or powder form are to be transported in receptacles and/or containers/tankers reserved for the transport of foodstuffs. Such containers are to be marked in a clearly visible and indelible fashion, to show that they are used for the transport of foodstuffs, or are to be marked ‘for foodstuffs only’.

o) Where conveyances and/or containers have been used for transporting anything other than foodstuffs or for transporting different foodstuffs, there is to be effective cleaning between loads to avoid the risk of contamination.

p) Foodstuffs in conveyances and/or containers are to be so placed and protected as to minimize the risk of contamination.

q) Where necessary, conveyances and/or containers used for transporting foodstuffs are to be capable of maintaining foodstuffs at appropriate temperatures and allow those temperatures to be monitored.

15.3 Recommendations

a) Covered facilities should be provided for loading and unloading vehicles, so that these operations can be carried out independently of weather conditions.

b) Refrigerated transport should be fitted with a temperature recorder and records of the temperature of the container or vehicle during transportation should be maintained.

c) Where the same refrigerated transport is used for deliveries to several points care should be taken to ensure that the temperature in the food section is maintained at the correct level.

d) Refrigerated transport should be fitted with a recording thermometer (thermograph).

15.4 General requirements for storage

The manufacturer shall provide adequate storage facilities to prevent damage or deterioration of the food. Stores and storage vessels shall be maintained in a hygienic condition and where controlled conditions are required, these shall be provided and the conditions shall be continuously monitored. The manufacturer shall provide adequate unloading facilities and all incoming material shall be inspected to ensure that, damaged goods which could cause spillages, or materials containing evidence of rodent or insect infestation, is not brought into the plant or factory, without taking adequate precautions. Adequate loading facilities shall also be provided.

15.5 Specific requirements for storage

a) There shall be adequate storage for raw materials, in process materials, where applicable, and finished product.

b) Unprocessed food shall not be stored in the same store as processed food, unless it can be shown there is no risk of cross contamination.

c) Food which requires special storage conditions, such as controlled atmosphere, temperature or relative humidity, shall be stored under the appropriate conditions, and records of the storage conditions shall be maintained.

d) Stores shall be rodent, insect and bird proofed and shall be maintained in a hygienic condition.

e) There shall be at least an 0.5 metre passageway around the walls or partitions of all stores, to prevent the establishment of breeding sites for rodents and to aid hygienic inspections, except in the case of racks. Where racks are used against walls there shall be at least a 0.3 metres clearance between the floor and the bottom of the rack.

f) The height of stacking shall be limited so that crushing or distortion does not occur on the lower layers, sufficient to damage the product or packaging. The top layer of stored product shall not make contact with the overhead structures, as this could facilitate access by crawling insects.

g) Storage tanks, bins and silos used for storage of food shall be constructed of suitable materials. They shall be fitted with suitable close fitting covers, which shall be kept in place at all times and if vented, the venting shall be designed and maintained so as not to contaminate the contents. The inlet valves and pipework shall be maintained in a hygienic condition and precautions shall be taken to ensure that access to the pipework by rodents, birds and insects is prevented.

h) All goods received shall be inspected in accordance with documented procedures, to ensure that damaged goods which could cause spillages are not brought into the warehouse without taking appropriate action to prevent the danger of spillages. They shall be inspected for evidence of rodent or insect infestation and if present shall not be taken into the store until appropriate defined action is taken.

16 Zoning

16.1 Introduction

Unprocessed food can cause contamination of processed food either by direct contact or by micro-organisms being carried from the unprocessed food to the processed food by air, water or personnel. Food can also be contaminated by the same means from areas such as micro-biological laboratories, effluent plants and chemical contamination can occur from steam boilers, refrigeration plants, detergents, etc. Thus it is necessary to physically separate areas, within a food factory, to prevent potential contamination of the food, and to adequately control the access of personnel to production and laboratory areas.

16.2 General requirements

The manufacturer shall take effective action to protect the food produced for those operations which may cause contamination with undesirable micro-organisms, chemicals, filth or other extraneous material. The manufacturer shall control access to areas where food is sensitive to contamination and shall take adequate precautions to ensure, that personnel entering food processing areas, are not a source of contamination from other areas. (Refer also to 12.4.)

16.3 Specific requirements

a) Production areas where processed foods are exposed shall be physically separated where possible from areas where unprocessed or partially processed food is stored, prepared or handled. Where this is not possible, due care shall be taken to ensure that the final product is not contaminated by food which has not been fully processed. [Refer also to the requirements in 12.4 for High Risk Foods.]

b) Separate storage areas shall be provided, for processed and unprocessed foods, unless it can be demonstrated that contamination of the processed food cannot occur.

c) Access to processing areas and particularly areas where food is exposed shall be restricted. The level of restriction required, will depend on the risk of contamination of the food.

d) Microbiological laboratories shall be physically separated from production areas and protective clothing used in the microbiological laboratory shall not be worn in food processing areas.

16.4 Recommendations

a) The manufacturer should identify areas and operations from which there is a risk of contamination of the food with undesirable micro-organisms, odours, chemicals, filth and other extraneous materials. These areas should be physically separated either by partition, location or other effective means and access to these areas should be adequately controlled, to prevent contamination of food.

b) Personnel working or entering the processing areas should not enter the micro-biological laboratories.

c) Personnel should not go from areas where raw materials are handled into areas where finished product is exposed; if essential, adequate precautions should be taken to ensure that micro-organisms are not carried on their person.

d) For High Risk processing areas access should be through a changing room, where personnel entering the area are required to change their footwear and protective clothing and to wash their hands; or via an air lock fitted with a foot and boot bath, hand washing facilities and changing facilities.

17 Warehousing

17.1 General requirements

Materials and products shall be stored in clean, dry, well ventilated spaces protected from dust, condensation, fumes, odours or other sources of contamination.

17.2 Warehousing requirements

Effective control of warehousing temperature, humidity and other environmental conditions shall be provided where required by product or storage specifications.

NOTE It is recommended that where products are stacked, consideration is given to measures necessary to protect the lower layers.

Waste materials and chemicals (cleaning products, lubricants, and pesticides) shall be stored separately.

A separate area or other means of segregating materials identified as non-conforming shall be provided.

Specified stock rotation systems (FIFO/FEFO) shall be observed.

Gasoline or diesel powered fork lift trucks shall not be used in food ingredient or product storage areas.

17.3 Vehicles, conveyances and containers

Vehicles, conveyances and containers shall be maintained in a state of repair, cleanliness and condition consistent with requirements given in relevant specifications.

Vehicles, conveyances and containers shall provide protection against damage or contamination of the product. Control of temperature and humidity shall be applied and recorded where required by the organization.

Where the same vehicles, conveyances and containers are used for food and non-food products, cleaning shall be carried out between loads.

Bulk containers shall be dedicated to food use only. Where required by the organization, bulk containers shall be dedicated to a specified material.

18 Services

18.1 Introduction

In a food factory contamination of food can be caused by inadequate or poorly designed or maintained services. Micro-organisms can be carried on dust particles in the air, or can be contained in water. Steam can also be a source of chemical contamination and condensation. Services ducting can be used by rodents and insects to gain entry to the plant and inadequate control of waste and effluent can lead to the establishment of breeding sites for rodents, birds and insects.

18.2 General requirements

Adequate services shall be provided by the manufacturer and they shall be designed, maintained, controlled and monitored so as to avoid the risk of contamination of the food, at all stages of production.

18.3 Specific requirements — Constructional

a) Electrical equipment shall be appropriate, e.g. in a wet area or an area where washing takes place, electrical equipment must comply with the requirements for this type of use.

b) Cladding used for pipework shall be suitable for use in a food area and shall be covered with aluminium or a suitable alternative.

c) Appropriate materials shall be used for services and services lines. The materials shall not contaminate the services being carried and shall be inert to attack by cleaning agents, where appropriate.

d) Extraction units shall be provided for equipment which gives off fumes or steam and shall be adequate to prevent the build-up of condensation or fumes in the processing areas.

e) Equipment which requires drainage shall be piped directly to drain.

f) There shall be a water seal on all drains and drains shall discharge directly into a piped sewer which itself shall be water sealed.

g) Service entry and exit points shall be adequately sealed. The sealing shall be smooth and special precautions shall be taken to ensure that service entry and exit points do not provide access for rodents.

h) Adequate services shall be provided and shall be properly installed and maintained.

18.4 Specific requirements — Ventilation/air quality

a) Forced ventilation, if present, shall be designed so that air flows in the opposite direction to product flows. Air intake points shall be at least 1 metre above internal floor levels and 1 metre above outside surfaces.

b) Ventilation throughout the factory must be sufficient to prevent condensations on walls, ceilings and overhead structures under normal operating conditions.

c) Air intake points shall be at least fitted with a fly screen and should be fitted with dust filters. They shall be located so as to avoid the intake of air contaminated by micro-organisms, dust, aerosols, chemicals, smoke, etc. Where appropriate air shall be filtered to the required class.

d) The temperature in various sections of the factory shall comply with any relevant legislation and shall be controlled where necessary to protect the quality of the food.

e) Where necessary to protect the quality of the food, relative humidity shall be controlled.

f) Where the control of air, temperature, relative humidity or relative pressure is deemed necessary to protect the quality of the food, these parameters shall be measured and recorded. Cooling of unwrapped foods should be carried out in an area supplied with mould free air.

g) Where appropriate, to control the risk of food contamination the microbial quality of the air shall be monitored.

18.5 Specific requirements — Compressed air and gases

a) Compressed air which comes into contact with food shall be dry to prevent the build-up of micro-organisms in the air lines and shall be free from micro-organisms, chemicals, dirt and filth which could contaminate the food.

b) Where appropriate non-return valves shall be fitted in the air lines to prevent the entry of food into the lines.

c) Compressed air shall not be used for cleaning purposes in processing areas as used in this way will cause dirt to spread around the factory.

d) Compressed air, carbon dioxide, nitrogen and oxygen shall be filtered through a micron filter located close to the point of use, if the gas comes in contact with food.

18.6 Specific requirements — Water

a) Storage tanks, reservoirs, etc. for water shall be covered so as to present the contamination of the water by birds, rodents, organic and inorganic matter and shall be inspected weekly. The air vents to these tanks and reservoirs shall be insect and rodent proof.

b) Vacuum brakers shall be included in the water system in all locations where back-syphoning of contaminated water could occur.

c) Flexible hoses, if used, shall be suitable for food use, shall not be immersed in liquids unless designed for this purpose and if immersed shall be in the cleaning programme. When not in use they shall be properly stored on a reel or equivalent.

d) Potable water shall comply with EAS 12.

e) Non potable water can be used provided, that it cannot contaminate the food, that the non-potable water lines are colour coded or labelled every two metres and that there is no interconnection between the potable and non-potable water supply. Non-potable water shall not be used for cooling cans.

f) Where water is used as an ingredient or processing aid, it shall be potable and shall have appropriate chemical, microbiological and organoleptic specification.

g) If water is dechlorinated to prevent chlorophenol taints, appropriate precautions shall be taken in handling the water and storage time shall be maintained at a minimum.

18.7 Specific requirements — Steam

a) Steam which comes into direct contact with food or with water shall only contain additives that are permitted for use by law or Good Manufacturing Practices and the total solids in the boiler shall be controlled so as to avoid carryover of boiler solids.

b) Boilers should be properly operated and maintained.

18.8 Specific requirements — Waste; storage and disposal

a) Skips or containers for waste, offal and other waste material shall be covered and emptied at least once per week, or more frequently as is consistent with minimising the risk of infestation.

b) Skips or containers for waste shall be located as far as practicable from processing areas and air intake areas and shall be sited on a self-drainage concrete, tarmacadam or an equivalent surface.

c) Combustible waste, if incinerated shall be burned in an incinerator of an approved design located at adequate distance from the factory, so as to avoid a fire hazard or contamination of the factory air supply.

d) Waste containers shall be provided in appropriate locations in the factory. Only such containers shall be used for the disposal of waste. The containers shall be such that they cannot be mistaken for food containers and shall be emptied daily. Packaging material whether damaged or not shall not be used as a waste receptacle.

18.9 Specific requirements — Liquid waste disposal

a) All floor drains shall be fitted with effective traps and shall be covered with a suitable grid. They shall be maintained in a clean condition and shall be sanitized at appropriate intervals to prevent the risk of contamination of the food.

b) Sewerage lines shall be adequate in size and shall be cleaned when necessary by rods or other appropriate means. Ideally this should be done using manholes located outside the factory.

c) Manholes within the factory should be avoided but if essential shall be doubly sealed.

d) If effluent is being treated on site or close to the site, the effluent plant should be located as far as possible downwind from the air intake points of the factory.

e) The effluent plant must be adequate in size to handle the maximum anticipated loading both in terms of hydraulic and BOD loading and must be adequately controlled to meet the specified requirements for treated effluent and to avoid the risk of pollution.

18.10 Specific requirements — Electrical lighting

a) All light fittings shall be of the safety type in all areas other than office space remote from the factory.

b) Where appropriate, white light shall be used, e.g. where the colour of the food is a critical quality parameter and has to be monitored.

c) The minimum in density of light shall be as follows:

- 540 lux (50 ft candles) at inspection points
- 220 lux (20 ft candles) in general work areas
- 110 lux (10 ft candles) in other areas

18.11 Specific requirements — Wash hand basins and sterilizers

a) Wash hand basins, troughs or washing fountains shall be provided in all production areas convenient to personnel entry points and adjacent to work stations, where their absence would present a risk to the safety of the food. They shall be provided in all areas where food is handled.

b) Wash hand basins, troughs or washing fountains shall be supplied either with warm water or cold and hot water and the taps shall be elbow, knee, foot or electronically operated

c) Hand sanitizing solutions or sanitizing liquid soap shall be provided at each hand washing point.

d) Knife Sterilisers if used or required by law shall be maintained at 82 °C minimum when in use.

18.12 Recommendations

a) Potable water should be chlorinated in-house to ensure a minimum residual free chlorine level of 0.1 to 0.2 ppm at the point of use or treated with a suitable source of UV light or the equivalent. Chlorinated water should be stored for a minimum of 20 minutes to allow adequate contact time for the chlorine.

b) Methods of treatment should be fitted with a visual or audible alarm system which will be activated in the event of failure of the system. This alarm system should be checked at defined intervals and records of the checks kept.

c) The residual free chloride level of potable water should be checked regularly at the points most likely to be low in chlorine, e.g. the end of the longest pipe run from the source of supply, water storage tank or chlorination plant. At least one check should be carried out daily. Where the quality of water is critical to the safety of food, e.g. cooling water for cans, checks should be carried out daily for the residual free chlorine level.

d) If UV light is used to ensure the safety of potable water the intensity of the light source should be checked at regular intervals and records of such checks kept.

e) The microbiological quality of potable water should be checked monthly or weekly for the presence of coliforms. The results shall conform to EAS 12.

f) Aerosolised water (e.g. cooling towers, refrigeration plant cooling units and ventilation systems) can be a source of Legionella, and can result in legionnaires' disease in susceptible people. Hence precautions should be taken in such systems which operate between 20 °C and 55 °C to prevent the build up of Legionella. Temperature in excess of 60 °C or effective biocides can be used as methods of control.

g) Where natural light is used in food processing areas the windows or skylights should be ideally North facing.

h) Plant service should not interrupt the smooth finish of walls, ceiling or floor.

19 Product information and consumer awareness

Objectives:

Products should bear appropriate information to ensure that:

- adequate and accessible information is available to the next person in the food chain to enable them to handle, store, process, prepare and display the product safely and correctly;
- the lot or batch can be easily identified and recalled if necessary.

Consumers should have enough knowledge of food hygiene to enable them to:

- understand the importance of product information;
- make informed choices appropriate to the individual; and
- prevent contamination and growth or survival of foodborne pathogens by storing, preparing and using it correctly.

Information for industry or trade users should be clearly distinguishable from consumer information, particularly on food labels.

Rationale:

Insufficient product information, and/or inadequate knowledge of general food hygiene, can lead to products being mishandled at later stages in the food chain. Such mishandling can result in illness, or products becoming unsuitable for consumption, even where adequate hygiene control measures have been taken earlier in the food chain.

19.1 Lot identification

Lot identification is essential in product recall and also helps effective stock rotation. Each container of food should be permanently marked to identify the producer and the lot. ARS 56 applies.

19.2 Production information

All food products should be accompanied by or bear adequate information to enable the next person in the food chain to handle, display, store and prepare and use the product safely and correctly.

NOTE Information may be provided by labelling or other means, such as company websites and advertisements, and may include storage, preparation and serving instructions applicable to the product.

19.3 Labelling

Prepackaged foods should be labelled with clear instructions to enable the next person in the food chain to handle, display, store and use the product safely. ARS 56 applies.

19.4 Consumer education

Health education programmes should cover general food hygiene. Such programmes should enable consumers to understand the importance of any product information and to follow any instructions accompanying products, and make informed choices. In particular consumers should be informed of the relationship between time/temperature control and foodborne illness.

20 Training

Objective:
Those engaged in food operations who come directly or indirectly into contact with food should be trained, and/or instructed in food hygiene to a level appropriate to the operations they are to perform.

Rationale:

Training is fundamentally important to any food hygiene system.

Inadequate hygiene training, and/or instruction and supervision of *all* people involved in food related activities pose a potential threat to the safety of food and its suitability for consumption.

20.1 Awareness and responsibilities

20.1.1 Food hygiene training is fundamentally important. All personnel should be aware of their role and responsibility in protecting food from contamination or deterioration. Food handlers should have the necessary knowledge and skills to enable them to handle food hygienically. Those who handle strong cleaning chemicals or other potentially hazardous chemicals should be instructed in safe handling techniques.

20.1.2 Food business operators shall ensure:

a) that food handlers are supervised and instructed and/or trained in food hygiene matters commensurate with their work activity;

b) that those responsible for the development and maintenance of the procedure referred to in Annex A of this Code or for the operation of relevant guides have received adequate training in the application of the HACCP principles; and

c) compliance with any requirements of national law concerning training programmes for persons working in certain food sectors.

20.2 Training programmes

Factors to take into account in assessing the level of training required include:

- the nature of the food, in particular its ability to sustain growth of pathogenic or spoilage micro-organisms;
- the manner in which the food is handled and packed, including the probability of contamination;
- the extent and nature of processing or further preparation before final consumption;
- the conditions under which the food will be stored; and
- the expected length of time before consumption.

20.3 Instruction and supervision

Periodic assessments of the effectiveness of training and instruction programmes should be made, as well as routine supervision and checks to ensure that procedures are being carried out effectively.

Managers and supervisors of food processes should have the necessary knowledge of food hygiene principles and practices to be able to judge potential risks and take the necessary action to remedy deficiencies.

20.4 Refresher training

Training programmes should be routinely reviewed and updated where necessary. Systems should be in place to ensure that food handlers remain aware of all procedures necessary to maintain the safety and suitability of food.

21 Records

21.1 Introduction

It is essential that records are maintained of all actions taken to assure the safety of food. These records can be used to demonstrate that appropriate action has been taken to assure the safety of the food. In addition they can be used as an aid to effective management of product safety.

21.2 General requirement

The manufacturer shall establish and maintain procedures for identification, collection, indexing, filing, storage, maintenance and disposition of hygiene records.

21.3 Specific requirements

i) Records shall be maintained of all actions, test results and other relevant information required to ensure that hygiene is maintained at an appropriate level to assure the safety of the food produced.

ii) These records shall be indexed, filed, stored and maintained for a suitable period and procedures shall exist for the disposition of out of date records.

iii) Records shall include

- A record of all critical parameters and tests carried out to assure the safety of the finished product, and the results of these tests, including microbiological results. (Hazard Analysis and Critical Control Point system — HACCP.)

- The calibration status and procedures used to calibrate all devices used to assure the safety of the finished product.

- Records showing that all staff members have been appropriately screened as suitable to work in a food premises by a medical examiner and they are trained in the principles of hygiene.

- Records showing that the cleaning programme has been adhered to and that the strengths, temperatures and contact time of cleaning solutions complies with the specified requirements

- Records showing that the factory has been inspected for evidence of infection by rodents, birds, animals or insects at, at least three monthly intervals, by a suitably qualified person.

- Records showing that incoming material, where appropriate, has been inspected for the presence of rodents or insects and that distribution vehicles have been inspected.

- Records showing that water storage vessels are inspected on a weekly basis for the presence of birds, rodents, etc., daily records of residual free chlorine levels and records of other water analysis.

- Records showing that a hygiene/housekeeping inspection has been carried out at defined intervals using a written checklist.

iv) Where appropriate to ensure the safety of food, the following records shall also be maintained.

- Chemical, functional, microbiological and organoleptic specifications for raw materials, in process materials and finished product.

- Records of environmental tests.

- Records showing that the tubes in insect electrocuters are replaced at appropriate intervals.

- Records of controlled conditions such as temperature, relative humidity, controlled atmosphere and positive and negative air pressures and air quality during production, storage and distribution.

- Appropriate records for the effluent plant to show that treated effluent complies with specified requirements.

- Records showing that glass pipes, flow meter and glass equipment has been routinely inspected for cracks, splinters, etc.

- Records showing that air filters have been inspected and replaced at appropriate intervals.

- Records of sensitivity checks on metal detectors.

v) Where it is found, that hygiene is not being maintained at the defined level, records shall be maintained of the corrective action taken, to bring it under control.

vi) All records shall be signed by an appropriate person or persons and dated.

22 Food defence, biovigilance and bioterrorism

22.1 General requirements

Each establishment shall assess the hazard to products posed by potential acts of sabotage, vandalism or terrorism and shall put in place proportional protective measures.

22.2 Access controls

Potentially sensitive areas within the establishment shall be identified, mapped and subjected to access control.

NOTE Where feasible, access should be physically restricted by use of locks, electronic card key or alternative systems.

Annex A
(normative)

Hazard analysis and critical control point (HACCP) system and guidelines for its application

A.1 Preamble

The first section of this document sets out the principles of the Hazard Analysis and Critical Control Point (HACCP) system adopted by the Codex Alimentarius Commission. The second section provides general guidance for the application of the system while recognizing that the details of application may vary depending on the circumstances of the food operation.[1]

The HACCP system, which is science based and systematic, identifies specific hazards and measures for their control to ensure the safety of food. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on end-product testing. Any HACCP system is capable of accommodating change, such as advances in equipment design, processing procedures or technological developments.

HACCP can be applied throughout the food chain from primary production to final consumption and its implementation should be guided by scientific evidence of risks to human health. As well as enhancing food safety, implementation of HACCP can provide other significant benefits. In addition, the application of HACCP systems can aid inspection by regulatory authorities and promote international trade by increasing confidence in food safety.

The successful application of HACCP requires the full commitment and involvement of management and the work force. It also requires a multidisciplinary approach; this multidisciplinary approach should include, when appropriate, expertise in agronomy, veterinary health, production, microbiology, medicine, public health, food technology, environmental health, chemistry and engineering, according to the particular study. The application of HACCP is compatible with the implementation of quality management systems, such as the ISO 9000 series, and is the system of choice in the management of food safety within such systems.

While the application of HACCP to food safety was considered here, the concept can be applied to other aspects of food quality.

A.2 Definitions

Control (verb)
To take all necessary actions to ensure and maintain compliance with criteria established in the HACCP plan.

Control (noun)
The state wherein correct procedures are being followed and criteria are being met.

Control measure
Any action and activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Corrective action
Any action to be taken when the results of monitoring at the CCP indicate a loss of control.

Critical Control Point (CCP)
A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

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[1] The Principles of the HACCP System set the basis for the requirements for the application of HACCP, while the Guidelines for the Application provide general guidance for practical application.

Critical limit
A criterion which separates acceptability from unacceptability.

Deviation
Failure to meet a critical limit.

Flow diagram
A systematic representation of the sequence of steps or operations used in the production or manufacture of a particular food item.

HACCP
A system which identifies, evaluates, and controls hazards which are significant for food safety.

HACCP plan
A document prepared in accordance with the principles of HACCP to ensure control of hazards which are significant for food safety in the segment of the food chain under consideration.

Hazard
A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

Hazard analysis
The process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety and therefore should be addressed in the HACCP plan.

Monitor
The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.

Step
A point, procedure, operation or stage in the food chain including raw materials, from primary production to final consumption.

Validation
Obtaining evidence that the elements of the HACCP plan are effective.

Verification
The application of methods, procedures, tests and other evaluations, in addition to monitoring to determine compliance with the HACCP plan.

A.3 Principles of the HACCP system

The HACCP system consists of the following seven principles:

PRINCIPLE 1

Conduct a hazard analysis.

PRINCIPLE 2

Determine the Critical Control Points (CCPs).

PRINCIPLE 3

Establish critical limit(s).

PRINCIPLE 4

Establish a system to monitor control of the CCP.

PRINCIPLE 5

Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control.

PRINCIPLE 6

Establish procedures for verification to confirm that the HACCP system is working effectively.

PRINCIPLE 7

Establish documentation concerning all procedures and records appropriate to these principles and their application.

A.4 Guidelines for the application of the HACCP system

Introduction

Prior to application of HACCP to any sector of the food chain, that sector should have in place prerequisite programs such as good hygienic practices according to the Codex General Principles of Food Hygiene, the appropriate Codex Codes of Practice, and appropriate food safety requirements. These prerequisite programs to HACCP, including training, should be well established, fully operational and verified in order to facilitate the successful application and implementation of the HACCP system.

For all types of food business, management awareness and commitment is necessary for implementation of an effective HACCP system. The effectiveness will also rely upon management and employees having the appropriate HACCP knowledge and skills.

During hazard identification, evaluation, and subsequent operations in designing and applying HACCP systems, consideration must be given to the impact of raw materials, ingredients, food manufacturing practices, role of manufacturing processes to control hazards, likely end-use of the product, categories of consumers of concern, and epidemiological evidence relative to food safety.

The intent of the HACCP system is to focus control at Critical Control Points (CCPs). Redesign of the operation should be considered if a hazard which must be controlled is identified but no CCPs are found.

HACCP should be applied to each specific operation separately. CCPs identified in any given example in any Codex Code of Hygienic Practice might not be the only ones identified for a specific application or might be of a different nature. The HACCP application should be reviewed and necessary changes made when any modification is made in the product, process, or any step.

The application of the HACCP principles should be the responsibility of each individual businesses. However, it is recognised by governments and businesses that there may be obstacles that hinder the effective application of the HACCP principles by individual business. This is particularly relevant in small and/or less developed businesses. While it is recognized that when applying HACCP, flexibility appropriate to the business is important, all seven principles must be applied in the HACCP system. This flexibility should take into account the nature and size of the operation, including the human and financial resources, infrastructure, processes, knowledge and practical constraints.

Small and/or less developed businesses do not always have the resources and the necessary expertise on site for the development and implementation of an effective HACCP plan. In such situations, expert advice should be obtained from other sources, which may include: trade and industry associations, independent experts and regulatory authorities. HACCP literature and especially sector-specific HACCP guides can be valuable. HACCP guidance developed by experts relevant to the process or type of operation may provide a useful tool for businesses in designing and implementing the HACCP plan. Where businesses are using expertly developed HACCP guidance, it is essential that it is specific to the foods and/or processes under consideration. More detailed information on the obstacles in implementing HACCP, particularly in reference to SLDBs, and recommendations in resolving these obstacles, can be found in “Obstacles to the Application of HACCP, Particularly in Small and Less Developed Businesses, and Approaches to Overcome Them” (document in preparation by FAO/WHO).

The efficacy of any HACCP system will nevertheless rely on management and employees having the appropriate HACCP knowledge and skills, therefore ongoing training is necessary for all levels of employees and managers, as appropriate.

A.5 Application

The application of HACCP principles consists of the following tasks as identified in the Logic Sequence for Application of HACCP (Figure 1).

1. Assemble HACCP team

The food operation should assure that the appropriate product specific knowledge and expertise is available for the development of an effective HACCP plan. Optimally, this may be accomplished by assembling a multidisciplinary team. Where such expertise is not available on site, expert advice should be obtained from other sources, such as, trade and industry associations, independent experts, regulatory authorities, HACCP literature and HACCP guidance (including sector-specific HACCP guides). It may be possible that a well-trained individual with access to such guidance is able to implement HACCP inhouse. The scope of the HACCP plan should be identified. The scope should describe which segment of the food chain is involved and the general classes of hazards to be addressed (e.g. does it cover all classes of hazards or only selected classes).

2. Describe product

A full description of the product should be drawn up, including relevant safety information such as: composition, physical/chemical structure (including Aw, pH, etc), microcidal/static treatments (heat-treatment, freezing, brining, smoking, etc), packaging, durability and storage conditions and method of distribution. Within businesses with multiple products, for example, catering operations, it may be effective to group products with similar characteristics or processing steps, for the purpose of development of the HACCP plan.

3. Identify intended use

The intended use should be based on the expected uses of the product by the end user or consumer. In specific cases, vulnerable groups of the population, e.g. institutional feeding, may have to be considered.

4. Construct flow diagram

The flow diagram should be constructed by the HACCP team (see also paragraph 1 above). The flow diagram should cover all steps in the operation for a specific product. The same flow diagram may be used for a number of products that are manufactured using similar processing steps. When applying HACCP to a given operation, consideration should be given to steps preceding and following the specified operation.

5. On-site confirmation of flow diagram

Steps must be taken to confirm the processing operation against the flow diagram during all stages and hours of operation and amend the flow diagram where appropriate. The confirmation of the flow diagram should be performed by a person or persons with sufficient knowledge of the processing operation.

6. List all potential hazards associated with each step, conduct a hazard analysis, and consider any measures to control identified hazards

(SEE PRINCIPLE 1)
The HACCP team (see "assemble HACCP team" above) should list all of the hazards that may be reasonably expected to occur at each step according to the scope from primary production, processing, manufacture, and distribution until the point of consumption.

The HACCP team (see "assemble HACCP team") should next conduct a hazard analysis to identify for the HACCP plan, which hazards are of such a nature that their elimination or reduction to acceptable levels is essential to the production of a safe food.

In conducting the hazard analysis, wherever possible the following should be included:

- the likely occurrence of hazards and severity of their adverse health effects;
- the qualitative and/or quantitative evaluation of the presence of hazards;
- survival or multiplication of micro-organisms of concern;
- production or persistence in foods of toxins, chemicals or physical agents; and,
- conditions leading to the above.

Consideration should be given to what control measures, if any exist, can be applied to each hazard. More than one control measure may be required to control a specific hazard(s) and more than one hazard may be controlled by a specified control measure.

7. Determine Critical Control Points

(SEE PRINCIPLE 2)[2]
There may be more than one CCP at which control is applied to address the same hazard. The determination of a CCP in the HACCP system can be facilitated by the application of a decision tree (e.g., Figure 2), which indicates a logic reasoning approach. Application of a decision tree should be flexible, given whether the operation is for production, slaughter, processing, storage, distribution or other. It should be used for guidance when determining CCPs. This example of a decision tree may not be applicable to all situations. Other approaches may be used. Training in the application of the decision tree is recommended.

If a hazard has been identified at a step where control is necessary for safety, and no control measure exists at that step, or any other, then the product or process should be modified at that step, or at any earlier or later stage, to include a control measure.

8. Establish critical limits for each CCP

(SEE PRINCIPLE 3)
Critical limits must be specified and validated for each Critical Control Point. In some cases more than one critical limit will be elaborated at a particular step. Criteria often used include measurements of temperature, time, moisture level, pH, Aw, available chlorine, and sensory parameters such as visual appearance and texture.

Where HACCP guidance developed by experts has been used to establish the critical limits, care should be taken to ensure that these limits fully apply to the specific operation, product or groups of products under consideration. These critical limits should be measurable.

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[2] Since the publication of the decision tree by Codex, its use has been implemented many times for training purposes. In many instances, while this tree has been useful to explain the logic and depth of understanding needed to determine CCPs, it is not specific to all food operations, e.g., slaughter, and therefore it should be used in conjunction with professional judgement, and modified in some cases.

9. Establish a monitoring system for each CCP

(SEE PRINCIPLE 4)
Monitoring is the scheduled measurement or observation of a CCP relative to its critical limits. The monitoring procedures must be able to detect loss of control at the CCP. Further, monitoring should ideally provide this information in time to make adjustments to ensure control of the process to prevent violating the critical limits. Where possible, process adjustments should be made when monitoring results indicate a trend towards loss of control at a CCP. The adjustments should be taken before a deviation occurs. Data derived from monitoring must be evaluated by a designated person with knowledge and authority to carry out corrective actions when indicated. If monitoring is not continuous, then the amount or frequency of monitoring must be sufficient to guarantee the CCP is in control. Most monitoring procedures for CCPs will need to be done rapidly because they relate to online processes and there will not be time for lengthy analytical testing. Physical and chemical measurements are often preferred to microbiological testing because they may be done rapidly and can often indicate the microbiological control of the product.

All records and documents associated with monitoring CCPs must be signed by the person(s) doing the monitoring and by a responsible reviewing official(s) of the company.

10. Establish corrective actions

(SEE PRINCIPLE 5)
Specific corrective actions must be developed for each CCP in the HACCP system in order to deal with deviations when they occur.

The actions must ensure that the CCP has been brought under control. Actions taken must also include proper disposition of the affected product. Deviation and product disposition procedures must be documented in the HACCP record keeping.

11. Establish verification procedures

(SEE PRINCIPLE 6)
Establish procedures for verification. Verification and auditing methods, procedures and tests, including random sampling and analysis, can be used to determine if the HACCP system is working correctly. The frequency of verification should be sufficient to confirm that the HACCP system is working effectively.

Verification should be carried out by someone other than the person who is responsible for performing the monitoring and corrective actions. Where certain verification activities cannot be performed in house, verification should be performed on behalf of the business by external experts or qualified third parties.

Examples of verification activities include:

- Review of the HACCP system and plan and its records;
- Review of deviations and product dispositions;
- Confirmation that CCPs are kept under control.

Where possible, validation activities should include actions to confirm the efficacy of all elements of the HACCP system.

12. Establish Documentation and Record Keeping

(SEE PRINCIPLE 7)
Efficient and accurate record keeping is essential to the application of a HACCP system. HACCP procedures should be documented. Documentation and record keeping should be appropriate to the nature and size of the operation and sufficient to assist the business to verify that the HACCP controls are in place and being maintained. Expertly developed HACCP guidance materials (e.g. sector-

specific HACCP guides) may be utilized as part of the documentation, provided that those materials reflect the specific food operations of the business.

Documentation examples are:

- Hazard analysis;
- CCP determination;
- Critical limit determination.

Record examples are:

- CCP monitoring activities;
- Deviations and associated corrective actions;
- Verification procedures performed;
- Modifications to the HACCP plan;

An example of a HACCP worksheet for the development of a HACCP plan is attached as Figure 3.

A simple record-keeping system can be effective and easily communicated to employees. It may be integrated into existing operations and may use existing paperwork, such as delivery invoices and checklists to record, for example, product temperatures.

A.6 Training

Training of personnel in industry, government and academia in HACCP principles and applications and increasing awareness of consumers are essential elements for the effective implementation of HACCP. As an aid in developing specific training to support a HACCP plan, working instructions and procedures should be developed which define the tasks of the operating personnel to be stationed at each Critical Control Point.

Cooperation between primary producer, industry, trade groups, consumer organisations, and responsible authorities is of vital important. Opportunities should be provided for the joint training of industry and control authorities to encourage and maintain a continuous dialogue and create a climate of understanding in the practical application of HACCP.

Standard

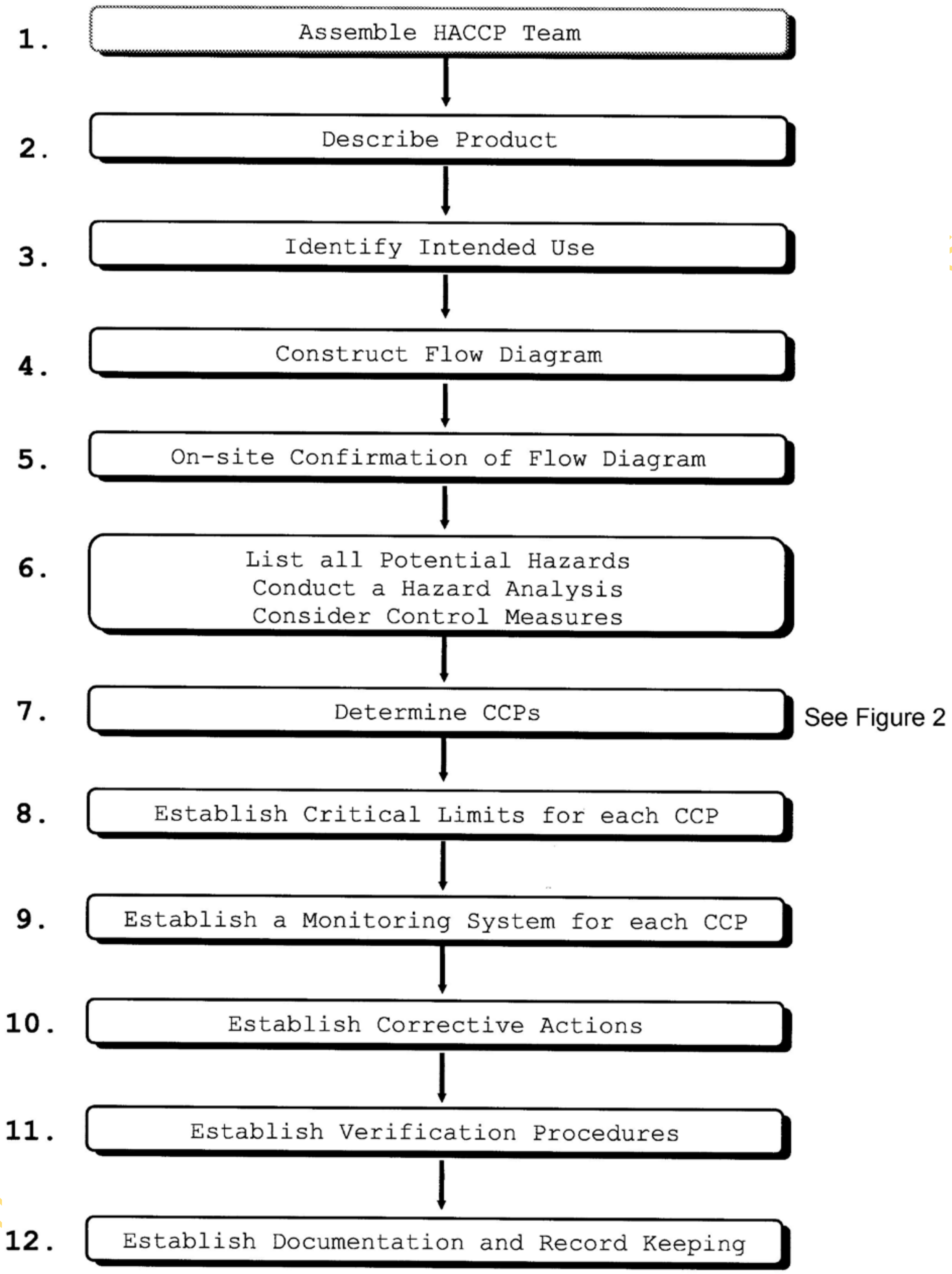
1.
Assemble HACCP Team
2.
Describe Product
3.
Identify Intended Use
4.
Construct Flow Diagram
5.
On-site Confirmation of Flow Diagram
6.
List all Potential Hazards
Conduct a Hazard Analysis
Consider Control Measures
7.
Determine CCPs
See Figure 2
8.
Establish Critical Limits for each CCP
9.
Establish a Monitoring System for each CCP
10.
Establish Corrective Actions
11.
Establish Verification Procedures
12.
Establish Documentation and Record Keeping

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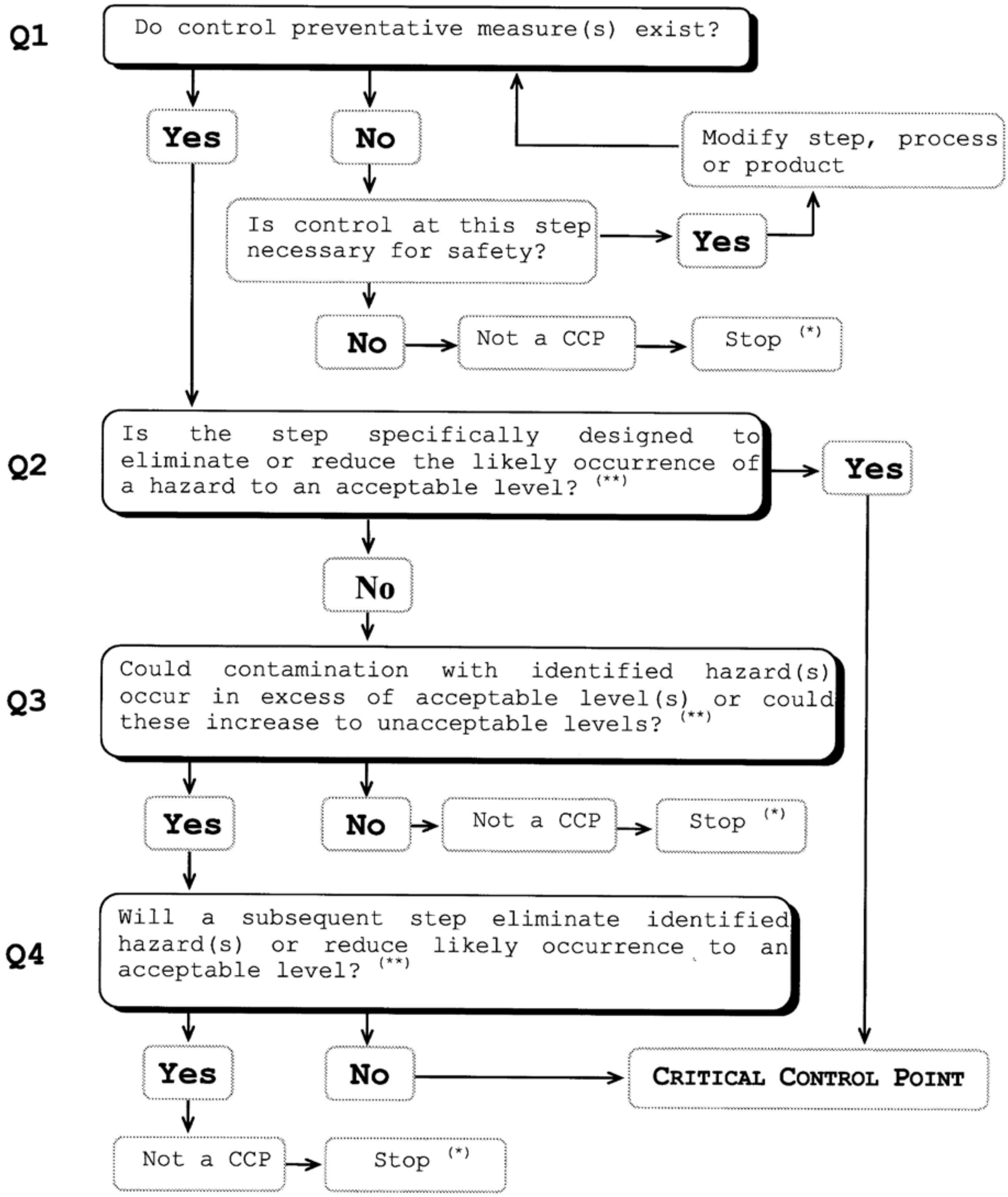
Figure 1 — Logic sequence for application of HACCP


Q1
Do control preventative measure(s) exist?
Yes
No
Modify step, process or product
Is control at this step necessary for safety?
Yes
No
Not a CCP
Stop (*)
Q2
Is the step specifically designed to eliminate or reduce the likely occurrence of a hazard to an acceptable level? (**)
Yes
No
Q3
Could contamination with identified hazard(s) occur in excess of acceptable level(s) or could these increase to unacceptable levels? (**)
Yes
No
Not a CCP
Stop (*)
Q4
Will a subsequent step eliminate identified hazard(s) or reduce likely occurrence to an acceptable level? (**)
Yes
No
CRITICAL CONTROL POINT
Not a CCP
Stop (*)

(*) Proceed to the next identified hazard in the described process.

(**) Acceptable and unacceptable levels need to be defined within the overall objectives in identifying the CCPs of HACCP plan.

Figure 2 — Example of decision tree to identify CCPs (answer questions in sequence)

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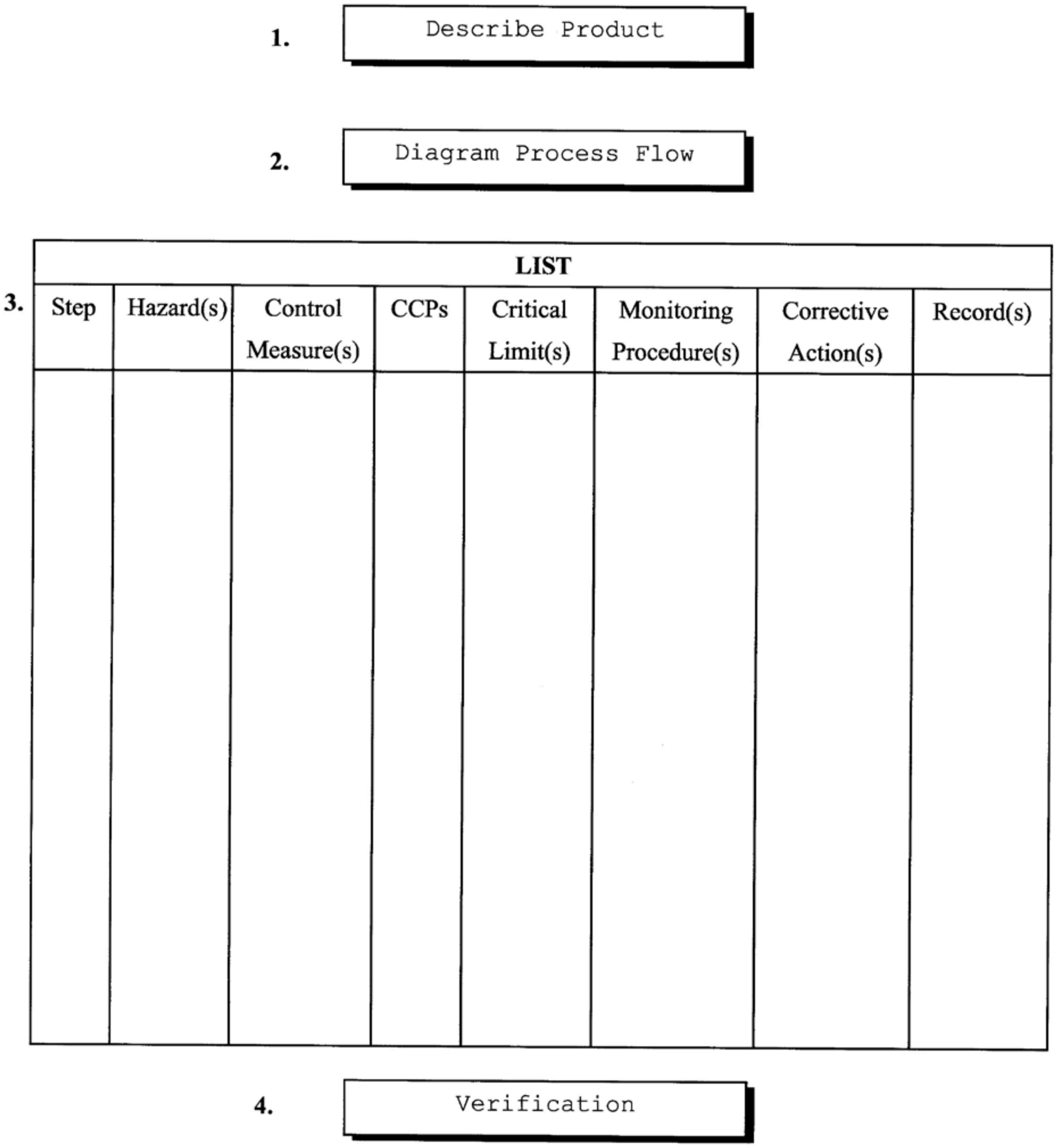

1. Describe Product

2. Diagram Process Flow

3.

LIST							
Step	Hazard(s)	Control Measure(s)	CCPs	Critical Limit(s)	Monitoring Procedure(s)	Corrective Action(s)	Record(s)

4. Verification

Figure 3 — Example of a HACCP worksheet

Bibliography

CAC/RCP 1-1969(Rev. 4-2003), *Recommended international code of practice — General principles of food hygiene*